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26. The maladies which are produced by the third class of agents, or by *specific infections and contagions*, are, with few exceptions, so generally recognised as the results of the operation of these agents, as to require no remark. The diseases that may be viewed as exceptions to this mode of origin by some writers, whose powers of argumentation and knowledge of the sources and course of morbid actions have secured for them but slight reputation with competent judges, cannot be more particularly alluded to in connection with their sources at this place.

27. *C. The diseases produced by infectious or contagious agents may be modified or aggravated, by superadded or consecutive causes.* — This is especially the case with those febrile maladies, which arise from endemic sources, and from animal effluvia. The emanations from the sick of these maladies, if allowed to accumulate around the patient, particularly where several are confined in ill-ventilated places, will aggravate the disease, impart to it new characters, and an infectious atmosphere may be thus generated capable of producing a modified, or even a different, but generally a much more malignant, malady, than that which originally existed. The aggravation of diseases by the accumulation of the emanations from the sick, or from any other source productive of infection, obtains generally. On the other hand, free ventilation exerts a beneficial influence, and prevents the contamination of the circulating fluids, as well as the depression of vital power that would otherwise result.

28. Humidity and dryness of the atmosphere have much influence upon inflectious maladies. The former not only gives activity to infectious agents, but also aggravates their effects, and predisposes the human frame to their operation. Infection is, in the first instance, thereby favoured and accelerated; and it is subsequently aggravated in the whole progress of its resulting phenomena. Dryness of the air, on the other hand, either prevents infection, or delays the development of its effects. The depressing passions, fear, and whatever lowers vital energy, are most influential and powerful concurring and aggravating causes of infection, both before it is fully developed, and during the course of its effects.

29. IV. Of the Period which elapses from the first Impression or Operation of Infectious Agents, till the Development of their Effects.—The period which elapses from exposure to the agents of infection until the development of their effects, varies remarkably in its duration, as respects not only different infectious maladies, but also different persons exposed to the impression of the same agent. This period has been denominated the *latent* period and the period of *incubation* by French pathologists. I have, in the articles Disease and Fever, called it the *formative*, *premonitory*, or *precursory* stage, or the period of *premonition*, because the changes taking place in the constitution during this stage are productive of the subsequent phenomena, and are generally manifested by certain symptoms, attention to which may often prove of essential service in the prevention or treatment of the consecutive disease. The *duration* of this period has been differently stated by different writers, as respects almost every infectious disease. In some of these diseases it is quite indeterminate; but, as regards others, it is more uniform. — *a*. The precursory period of diseases which proceed from terrestrial or paludal emanations, varies from six or seven days, to as many months. From data obtained by Dr. Gregory, it would appear, that of a number of persons exposed to malaria proceeding from the same source at a precise period, thirteen days were the shortest, and thirty-nine days the longest, duration of this period; and that in the greatest number, agues and remittents were developed on the 20th and 22d days after infection. In some cases, where I had an opportunity of observing this period, remittent fever appeared in some six or seven days, and in others a few days later, after exposure to the cause. Dr. Marsh infers, from numerous instances furnished him in Ireland, that this period may be protracted to eight or nine months.

30. *b*. The duration of the formative period in *typhoid fevers* has not been observed with sufficient precision. Dr. Haygarth declared that the minimum was seven days, and the maximum seventy-two days. Dr. Bancroft inferred the minimum period to be thirteen days; but the observations of Sir W. Burnett, Dr. Marsh, and others, prove that the period is much shorter. Dr. Marsh, indeed, endeavours to show that the febrile rigor may succeed almost immediately to the exposure to the infectious effluvium. But in many of the instances which he adduces, there is every reason to suppose that a previous exposure to infection had occurred, *that* which seemed to have made the morbid impression having only been a consecutive or determining cause of the disease. Dr. Williams thinks that this period may extend

from a few hours to a few weeks, or perhaps to a few months. I have stated, that it may not continue beyond twenty-four hours in the worst forms of these fevers, and that the most common duration is from three to fourteeen days. This agrees with some observations which I have lately had an opportunity of making. Dr. GREGORY considers that the medium duration of this period in these fevers is ten days.

31. *c*. The precursory or formative period in *measles* generally continues from seven or eight, to fifteen or twenty days. Dr. BATEMAN states it to vary from ten to fifteen days. Dr. GREGORY from eight to twenty-one days. Dr. WILLIAMS remarks, that the time which this poison might remain latent has been determined to vary from ten to sixteen days. This agrees with the observations of Dr. HEBERDEN and of Dr. HUE. — Dr. HOME, who first tried the inoculation of measles, observed that the eruption appeared on the sixth day afterwards. The experiments of inoculation in measles by VOGEL, MONRO, TISSOT, CULLEN, SPERANZA, and others, furnish no additional information on this subject.—M. GUERSENT is of opinion that *hooping-cough* appears five or six days after infection. I have stated that it is generally from five to nine days, or even longer, after exposure to infection, that the cough commences.

32. *d*. In *scarlet fever*, the formative period varies in duration from one, to twenty or twenty-five days. Dr. WILLIAMS considers that it continues from a few hours to about ten days. Dr. BINNS assigns two days as the shortest period; Dr. WITHERING three or four days; and Dr. HEBERDEN and Dr. FRANK five days; Dr. BLACKBURN believes that the period varies from four to seven days; and Dr. WILLAN, that it rarely continues longer than six days. The duration of this period depends much on the character of the epidemic. Dr. MATON observed, in one epidemic, this stage prolonged to twenty-five or twenty-six days. In a most malignant case of the disease, which I recently attended, infection was produced by some of the secretion from the mouth of a patient having been conveyed by the hand to the glans penis of a different person. Most violent asthenic inflammation and excoriation extended thence over the genitals, to the groins, abdomen, and inside of the thighs.

33. *e*. In *small-pox*, the duration of the precursory period varies from six, to twenty or twenty-one days. When the disease appears in the natural way, or by the medium of the air, Dr. GREGORY thinks twelve days to be then the usual period.— When small-pox is *inoculated*, the eruptive fever commences seven days afterwards, but it may be delayed a day or two longer. Indeed, cases occasionally appear, in which this period is either shorter or longer than that now stated.

34. *f*. In *plague*, the precursory period may be very short. Sir BROOKE FAULKNER has mentioned some cases, in which the attack seemed to follow almost immediately, or within a few hours, upon the impression of the infectious effluvium. Some writers have stated this period to vary from two to fifteen days, five days being its medium duration. The disease has occurred on the fourth day after its inoculation. — *True yellow fever* usually appears from two to twelve days after infection; but it may take place in a few hours after the impression of the morbid effluvium, when concentrated. — In *pestilential cholera*, the precursory period varies from one to six days, according to my own observations; and this agrees with the statements of others. This period may, however, be somewhat shorter or much longer than now stated. — True or *malignant puerperal fever* usually occurs from one to five days after infection, but it may be delayed beyond this period.

35. *g*. The time that the infection of *erysipelas* takes to develope itself has not been accurately determined. Dr. WILLIAMS thinks that it may vary from two to fourteen days. In the instance above alluded to, and in some others that I have seen, the period was not longer than thirty-six hours. In the various forms of infection proceeding from the inoculation of morbid matters, or from injuries during the dissection of recent or of putrid bodies, the constitutional effects are usually manifested within three days, sometimes in the course of a few hours and very rarely after four days.

36. *h*. The morbid secretions productive of the various forms of *venereal disease* evince their effects at various periods, between one or two days and two months. The *gonorrhœal* affection generally appears much earlier than the *syphilitic*; the former most frequently showing itself from two or three days to ten or twelve, — the latter from six or seven days to two or three weeks.

37. *i*. The virus of *rabies* takes a longer time in developing itself, than any other infectious agent. There can be no doubt of the precursory period of this malady being sometimes prolonged much beyond what is generally believed, although the very long intervals stated to have elapsed in some instances are quite apocryphal. There are, however, well attested cases of two years having passed from the insertion of the virus until the appearance of the malady. Instances of from four to twelve months having thus elapsed are by no means rare. The *shortest* period of premonition in rabies may be stated to be twenty-one days. In the greatest number of cases, the disease appeared from thirty-one to sixty-three days after the inoculation of the morbid secretion.

38. *After the first impression* of an infectious agent, until the development of its effects, or during the whole of this percursory period, the change produced in the economy presents certain general features, which are of the utmost importance to recognise, and to estimate aright. These changes are not materially different in the different infectious maladies: they vary, however, in intensity as much as in duration; but they often possess very nearly the same characters, which always manifest the production of a more or less noxious effect upon the economy — as depression of nervous and mental energy, and of all the manifestations of life. These manifestations are, however, severally depressed in different degrees, in different maladies, during this period; and certain organs experience this effect more than others, as well as betray a specific or peculiar mode of affection according to the nature of the infectious agent. In those distempers which proceed from the more intense or concentrated agents, and in which the precursory period is short and severe, the effect produced upon the nervous system is generally immediate and remarkable. Not only are the physical functions depressed and embarrassed, but the mental and moral powers are remarkably weakened or nearly

annihilated. In true yellow fever, in plague, and puerperal fever, the patients become indifferent to their fate, and care not for the most intimate relations. The sensibilities are not merely blunted, they are almost destroyed; and a similar effect is observed in many other infectious maladies, although not in so remarkable a degree. Much of the calmness displayed by persons in this, as well as in the more advanced stages of these diseases, results not so much from a philosophical or stoical suppression of the sentiments and emotions, as from a generally impaired power of the organic nervous system, and a consequent impairment or loss of the general sensibility, and of the cerebral energy. Hence the physical change is often such, that those parts of the frame which are the most intimately related to the manifestations of mind, or which either minister to them or are their instruments, are more or less incapable of discharging their offices.

39. V. The Symptoms or Indications of Infection vary remarkably in the rapidity of their production, in their intensity, and in their numbers, forms, and modes of grouping. But it is of importance that they should be recognised by the physician. When the infecting agent is intense, as when a concentrated animal effluvium or an accumulated emanation from the bodies of the sick is directed upon a susceptible person, then the effect may be as instantaneous as electricity, as well as most intense. In some rare cases of this kind, as in plague, and in other pestilential maladies, life may be destroyed in a few hours by the morbid impression which it has been quite incapable of opposing, and against which it has been unable to react. I have seen the emanations from typhoid fever, from yellow fever, and from pestilential cholera, immediately produce sickness, vomiting, pain, sinking and anxiety at the epigastrium, faintness, oppression at the chest, remarkably weak pulse, headach, and general vital depression, with pale countenance and shrunk surface; and from these the patient has never rallied, the symptoms increasing in severity, and others supervening, until death has occurred in a very few hours.

40. Where the agents are less active or less concentrated, or where the predisposition is not so great, a much longer time is taken in the development of the changes constituting the precursory period of infectious maladies; and in the majority of those, the vital powers resist the further progress of these changes in that particular direction, and a salutary *reaction* is established. In many instances, little or no complaint is made after exposure to infectious agents, although a morbid impression has actually been made by them. In some only a slight *malaise*, or an indefinite feeling of indisposition, indicative of depression of vital power, only is complained of. In others, the depression is much more manifest, and is attended with a weak or slow pulse, or with unusual acceleration of the pulse upon slight exertion; with chills, alternating with flushings or heat of skin, depression of spirits, and pallor of the countenance, great weakness of the joints, and impaired power of the digestive, secreting, and excreting functions. When infection is produced through the medium of the respiratory organs, the earliest effect that is observed is a feeling of constriction or oppression in the chest, or at the præcordia and epigastrium, attended by frequent sighing, gaping, forced and deep inspirations, and by uneasy sinking, depression, or nausea, and sometimes by pain at the stomach, and by vomiting. The natural and acquired appetites and desires are diminished or nearly abolished; nausea is readily excited by food; and the bowels are either costive or relaxed, or easily acted upon by purgatives. All the organic functions are impaired, and the sexual desire suppressed. The patient feels debilitated and fatigued; complains of headach, vertigo, or confusion of ideas; is morose, low spirited, sluggish, indolent, or incapable of exertion, or of directing his attention long to any object: he readily perspires, and his breathing becomes short and quick, on the least exertion. His sleep is unsound and unrefreshing, and he wakens, complaining of lassitude or of pains in his back and limbs. All the cerebro-spinal functions are weakened or disordered. The countenance and skin are unusually pale, sallow, or unhealthy; more rarely red; the eyes are languid and deficient in brilliancy; the breath is fœtid or cool; and the tongue is often loaded—occasionally red or flabby. The urine is sometimes pale and copious; and the cutaneous surface is dry, cool, and harsh or constricted. These symptoms are sometimes so slight as to escape particular attention, and are often insufficient to induce the patient to confine himself. They are frequently much more intense, without being different as to kind; their intensity increasing more or less rapidly, until a sensation of cold running down the back, with formication, chills, or rigors, supervene, indicating the approaching development of the malady.

41. When infection is produced by inoculation, the more immediate effects are somewhat differently manifested, according to the nature of the morbific agent; and, in those maladies which require a long precursory period for their full formation, several of the above symptoms are either altogether wanting, or are so slight as to escape detection. In some instances, persons actually infected may complain but little, or may experience merely slight debility, inaptitude for exertion, various dyspeptic symptoms, and depression of spirits. At last some consecutive or determining influence comes in operation, and the infectious agent, thus reinforced, soon produces its full effects.

42. In some instances, the premonitory period is characterised by remarkable mental depression, by a reserved manner, and by the anticipation of an approaching calamity or even death. When a person who has been exposed to infectious agents, particularly those which are liable to become epidemic, is possessed with the idea of his impending dissolution, this unfortunate termination generally takes place. This symptom, more, perhaps, than any other, indicates a dangerous functional lesion of the nervous system.

43. *There are various circumstances which favour or retard the development of infection.*—Several of them have been already noticed (§ 27.). Many of those which favour the development of infection, not only render the consequent disease much more severe than it would otherwise have been, but also complicate that disease, and impart to it a fatal tendency. Exposure to wet and cold, unpleasant or distressing intelligence, a debauch, excessive fatigue, and exhaustion from

any cause, during the precursory period, will not only accelerate the effects of infectious agents, but also give rise to inflammation, or congestion, or obstruction of some vital organ. This often occurs in measles, scarlet and typhoid fevers, hooping-cough, small-pox, &c. — Dr. Marsh justly remarks, that a principal reason of the danger and fatality of fever amongst medical practitioners is, that, during the latent period, they make an effort day after day to discharge their laborious duties, until at length they are reluctantly compelled to yield; the disease having gathered strength in the same proportion as they have made strong, but ineffectual, efforts to resist it. A slight illness may be prevented by a strong effort, but a severe one is thereby greatly, often fatally, aggravated, and this is not the case merely in respect of fever, but of every malady produced by infection. The circumstances which retard or prevent the development of infection will be considered hereafter, when the pathological views here stated will be applied to practical purposes.

44. VI. The Manner in which Infections and Contagions invade the Economy, and their immediate and direct Effects, have lately excited some discussion. And let it not be supposed that the subject is devoid of importance. For correct views respecting it will lead to the adoption of means for the protection of the system, both at the time of exposure and in the period which more immediately follows it, that will often prove successful in counteracting its earlier effects, or in rendering the course of the disease more mild. —*A*. It is now about twenty years since I endeavoured to show, by anatomical connections, by functional relations, and by intimate observation of the effects produced by the more energetic morbific agents, that their impression is first made chiefly upon *the organic nervous system*, although the change or effect thereby produced, necessarily soon extends to the vascular system, and even to the circulating fluids; and that this takes place when the infectious agent is inserted into a wound, as well as when it is inhaled into the lungs with the air. At the same time I endeavoured to show that certain agents may more especially affect the circulation by their imbibition or absorption into the blood. This is more especially the case when the infectious agent is received into the alimentary canal with the solid or fluid ingesta, or when it consists of morbid secretions formed in an organ or part admitting of their passage into the circulation. There can be no doubt of the respiratory organs being generally immediately affected by all those agents which are conveyed through the medium of the atmosphere. The cutaneous surface is sufficiently protected from the operation of the impalpable emanations constituting the most common and the most numerous infectious agents. The digestive mucous membrane, although less guarded than the cutaneous surface, is still less exposed than it to their action. It is chiefly, therefore, through the medium of the respiratory surfaces that these agents make their direct impression. On these surfaces the air may be said to undergo a process of digestion — certain elements or portions of it entering in the circulation, combining for a time with the circulating fluids, and promoting their perfect sanguifaction and assimilation; and from those surfaces certain gaseous fluids and elementary principles are given off, which have served their purposes in the economy. There is every reason to infer, that during this process, noxious matters floating in the air, or dissolved in the moisture of the atmosphere, produce a morbid impression upon the nerves supplying these surfaces, and upon the respiratory organs generally; and that this impression is more or less rapidly transmitted throughout the organic nervous system, — the other organs and general systems of the body, more immediately dependent upon this system, soon manifesting the effects thus produced. At the same time, the noxious emanations, thus conveyed to the lungs in the course of the respiratory functions, most probably affect the condition of the circulating organs and of the blood itself, — both these orders of effects taking place co-ordinately, or either of them in a more or less special manner. That certain infectious agents impress the organic nervous system directly and chiefly, is shown by the suddenness of the effects; by the sensations experienced at the time of exposure to those agents, especially to the emanations conveyed in the air; by the sense of constriction and oppression produced in the chest; by the frequent and forcible efforts made to dilate or fill the lungs, as if the impression of the infectious emanation had impaired the vital resiliency of these organs; by the offensive odour frequently perceived at the time of infection; by the sickness, fear, and alarm instantly afterwards felt; and by the other phenomena already enumerated.

45. *B*. Next to the impression and change in the nervous system of organic life, the alterations in *the circulating organs and fluids*, consequent upon infection, deserve attention. When infectious effluvia are inhaled into the lungs, the weak action of the heart soon indicates the depression of this system. The impulse of the heart is feeble, slow, or irregular, and oppressed. The pulse is weak, soft, compressible, or small — sometimes irregular. It indicates a want of tone; and when the infectious agent has acted with much intensity, absolutely or relatively, the sensation imparted by the artery suggests the idea that the contractility of the coats of the vessel is much impaired. From this defect of the contractility and tone of the blood-vessels arises, during the precursory period of diseases produced by the more energetic infections, the remarkable tendency to congestion of those parts of the circulating system, and of those vessels, which are the most removed from the influence of the heart's action. Hence the congestions of the spleen, of the portal vessels and hepatic veins, and of the sinuses within the cranium; and hence the retarded circulation through the lungs, and the fulness of the auricles and sinuses of the heart, giving rise to the sense of oppression at the præcordia and in the chest, and to the frequent sighing and forced inspirations attending this stage of disorder.

46. The effects produced by infection on the *blood* are not so immediately, or at least not so sensibly, evinced, as those induced in the functions of organs actuated by the organic nervous system. The blood may, however, be affected without the alteration being perceptible to the senses; and changes in the appearances of this fluid are usually visible, before alterations in its constitution can be detected by chemical tests or analysis. The pathological conditions of the blood during the earlier

stages of the diseases consequent upon infection have not been sufficiently observed, and far less satisfactorily investigated. Those which have been described are the results of prolonged or intense morbid action, probably aided in some cases by treatment and regimen. I have given, in the article BLOOD, a full view of those alterations, and explained their sources. But the subject, with all its interest and importance, has not since received any further elucidation. The state of vital depression, immediately produced by infectious agents, generally precludes the abstraction of blood, and the opportunity of observing its states. I have, however, seen some instances of blood having been taken from a vein during this state, owing to a misinterpretation of the headach, pain at the epigastrium, and oppression at the chest then complained of, and to the epidemic disposition to vascular depletion so prevalent amongst practitioners, excited and promoted as this disposition was by inexperienced writers, who inflicted their crudities and inanities upon the public, as well as upon the profession, soon after the commencement of the present century. In most of these cases the blood flowed with difficulty, was of a very deep or dark colour, and produced syncópe or great depression upon the loss of a few ounces. It coagulated rapidly, and separated into a very dark, large, and soft coagulum, which sunk in the serum; this latter being small in proportion to the clot. In some instances the separation was very imperfect, the coagulum being gelatinous; and occasionally no separation took place, particularly when the powers of life were remarkably depressed. The blood taken at the commencement of the cold stage of agues often presents the same appearances, but generally in a less degree. These appearances indicate rather the vital conditions of this fluid derived from the organic nervous system supplying the vascular system and vital organs, than any change in its chemical constitution. It is not probable that the *hæmatosine* is materially altered, or that the saline ingredients and albumen have undergone any diminution, as the circumstances upon which these appearances depend have not been sufficiently long in operation to produce these effects. The *fibrine* is, however, changed or diminished; this substance evincing, by its attraction and cohesion, the state of vital or nervous power. When the fibrine contracts slowly, firmly, and so as to form a firm clot, and allow the free separation of the serum, or to give rise to a buffy or cupped surface of the coagulum, the nervous and vital powers are unimpaired, and vascular action is increased, and generally increased in proportion as this state of the coagulum becomes more remarkable. When, on the other hand, the fibrine adheres quickly, but imperfectly; when the attraction between its molecules is weak, and consequently, when either no coagulum is formed, the blood assuming a gelatinous consistence as it cools, or when the coagulum is loose and soft, with merely a slight separation of the serum, this latter either surrounding it in a small quantity, or partially, or altogether covering it, the constitutional powers may be considered as greatly reduced; and, although the circulation may be accelerated, its tone and energy are much impaired, the vital contractility of the coats of the vessels upon their contents presenting a weak *antagonism* to the action of the heart.

47. The occasions on which the blood seems to be more immediately contaminated by infectious agents, are, first, when a specific virus or morbid secretion is inserted into a wound, or beneath the cuticle; and secondly, when putrid or septic matters are similarly applied. The period which elapses between the inoculation of a specific virus, and the development of the constitutional affection, however, by no means shows that the immediate operation is upon the blood, and that this period is required for the production of morbid changes in it. If we examine the subject closely, we can arrive at this conclusion only, — that the morbid matter affects first the vital conditions and actions, and ultimately the intimate organisation of the part to which it is applied — converting the appearances and sensible properties of the part to states somewhat similar to those characterising itself; and that the contamination thus produced, soon extends, either by its immedi at effects upon the organic nerves supplying the vessels of the part, and consecutively on the blood or by the imbibition or absorption of the morbid matter, or by both these channels, to the whole body, affecting more or less the blood, the secretions, and the soft solids. That the organic nervous system is the chief channel by which the first change induced in the part is communicated to the whole body, is shown by the circumstance of the constitutional effect being frequently as great whilst the local change is slight, as afterwards when it has become fully developed. Although the precise channel of primary infection cannot easily be demonstrated in cases of infection by inoculation, yet the ultimate effects, as respects both the solids and fluids, are sufficiently apparent. The facts and illustrations contained in the articles BLOOD (§110. *et seq.*), and FEVER (§18.526.), render further remark on this topic almost unnecessary. That the blood undergoes, at an earlier or later period of most infectious diseases, a remarkable change as respects its appearances and sensible properties, is sufficiently established. In what the chemical or intimate change may consist, has not been shown by analysis. There can be no doubt, however, that in the advanced progress of some of these maladies, the saline principles of the blood are either diminished in quantity or altered in their combinations, as shown by Dr. STEVENS. Indeed, this may be considered as a necessary consequence of the abstraction, during the disease, of the usual saline substances contained in the food. When the quantity of *chloride of sodium* used by an individual in the twenty four hours is considered, in connection with the fact that the whole of it passes into the circulation, we must expect a remarkable diminution of this salt, or of its base, in the blood of persons who have been but a few days affected by febrile or infectious maladies. The earliest changes, however, produced upon the blood are manifestly those of its vital conditions.

48. It is very reasonable to suppose that the influence exerted by the organic nervous system upon the circulating organs and vessels throughout their whole extent, and thence upon the contents of these vessels, will alter the appearances and conditions of these contents, as itself becomes altered by the influence of infectious agents; and that the effect thus produced upon the circulating fluids will reciprocate the morbid affection, and heighten disorder in the system more immediately

and directly impressed, — that, in short, nervous influence, which first experiences the morbid change, in communicating this change to the vascular system and circulating fluids, soon undergoes a further alteration, owing to the changes it has itself produced in these fluids. In some instances, however, and especially when putrid matters are applied to a wound, a more rapid contamination of the circulating fluids may be inferred. When these matters, or when morbid secretions, or blood in an advanced period of malignant or putrid diseases, are injected into the circulation, it is but reasonable to infer that the effects will be more immediate, and that they will be in most respects similar to the morbid conditions characterising the advanced stages of the malignant or putro-adynamic maladies produced by self-perpetuating infections or contagions. The interesting experiments of GASPARD, MAJENDIE, LEURET, and HAMMOND have fully established the truth of these inferences, as shown in the article just referred to.

49. *C.* The morbid impression made upon the organic nervous system, and the change induced upon the circulating organs, by infectious agents, necessarily *affect the secretions and excretions.* As the secreting and excreting organs are actuated chiefly by the organic nervous system, and as the vital manifestations of this system are remarkably depressed by infectious agents, the functions of these organs must consequently be more or less impaired soon after infection. It is chiefly owing to this circumstance, that the blood becomes altered in the progress of infectious diseases. In the article already noticed, I have fully shown that the imperfect performance of the functions of depuration is a chief cause of the morbid states of the blood; and that, as these functions are impaired in proportion as vital power is diminished, so must the secretions and excretions be disordered both in the early and in the advanced stages of infectious maladies. In the former of these stages, even the period of premonition, the disorder of these functions is often manifest, but they are diminished rather than vitiated. In the advanced stages, they are prominently vitiated as well as diminished; and sometimes, even when the vitiation is most remarkable, they are sufficiently abundant or even remarkably copious.

50. *D.* The *alterations produced in the soft solids by infection* are the latest in the procession of the consequent morbid phenomena, and vary remarkably with the nature of the infectious agent. Some of those agents produce certain determinate or specific effects upon the tissues. Thus the effluvium of small-pox affects the skin and mucous surfaces especially; — that of scarlet fever, the throat, digestive mucous surface, skin, and the membranes of the brain; — that of measles, the respiratory and cutaneous surfaces, &c.; — that of plague, the lymphatic system and glandular organs; — that of erysipelas, the integuments and cellular tissue; — that of syphilis, the absorbent glands, the periosteum, the skin, bones, and joints; and so on, as respects most kinds of infectious diseases. — These alterations are, however, much modified, or additional lesions are developed, by consecutive changes or influences; by the temperament, predisposition, or previous disorder of the patient; or even by the treatment, — as when certain complications appear from these or other circumstances, at the commencement, or during the course, of infectious fevers. Amongst the changes induced in the soft solids by infectious agents, the most important, and evidently the most intimately dependent upon the state of vital manifestation and the conditions of the circulating and secreted fluids, are the discolouration and the softening of membranous and parenchymatous structures. This discolouration and softening, as observed soon after death, are perfectly independent of incipient dissolution of the tissues, and are generally great in proportion as the infectious or contagious nature of the agent is remarkable. The general loss of the vital cohesion of the tissues is often so great, that even the most firm and coherent structures are torn with ease; the substance of the heart, and muscular parts, also participating in the change. (See art. FEVERS, § 527.)

51. VII. THE CIRCUMSTANCES WHICH FAVOUR INFECTION are numerous, and it is of importance that they should be recognised and well understood by the physician. These circumstances may be grouped — first, into those which are *intrinsic,* which concern the individual, or are proper to the recipient; — secondly, into those which are *extrinsic,* or which concur or co-operate with the infectious agent. — *a.* The circumstances proper to the recipient of infection are numerous, but the chief only of them can here receive particular notice. There is a *susceptibility* to infection from birth, which, in respect to some infections, diminishes with age, or is entirely exhausted or destroyed by the disease which it produces. This destruction of the susceptibility to infection is remarkable, as regards the exanthematic contagions, yellow fever, and hooping-cough; and, although it is not universal, yet the exceptions are very rare. In certain infectious maladies, as continued and typhoid fevers, the susceptibility increases with the progress to puberty, and diminishes gradually from the twenty-fifth or twenty-seventh year to old age. The danger, however, increases with this diminution, if infection actually takes place. Although typhoid fevers do not entirely exhaust the susceptibility to their infection, they manifestly weaken it. When a person has escaped infection, upon the first or the earlier exposures to several infectious maladies, he will generally continue to possess an immunity, unless circumstances should occur to increase his predisposition; for the infectious emanation produces a more sensible and marked effect on the economy, on the first occasion of exposure to it, than subsequently unless long intervals have elapsed between the periods of exposure. It is thus that several members of the same family so often escape, notwithstanding the rest are labouring under infectious maladies, — the susceptibility to them diminishing with the frequency of exposure, unless concurrent causes or influences reinforce the infecting agent.

52. The kind of susceptibility, which disposes to infection, varies much with different infectious maladies. In some, as typhoid fevers, youth and the prime of life are predisposing circumstances; and yet, fear of the disease, fatigue, exhaustion, and other causes altogether of an opposite character, have a similar influence, and concur with it. In others, as yellow fever, the seasoning, pernicious, and malignant fevers of warm climates, persons in the prime of life, and of the most robust

and plethoric constitutions, are the most liable to infection; whilst remittents and agues usually affect, in preference, the more debilitated, and persons of a weaker and more delicate frame. Most of the maladies, which are capable of propagating themselves, exhaust the susceptibility to reinfection. The chief exceptions to this are—venereal affections, plague, and purulent ophthalmia; whereas, the infections which are incapable of propagating themselves, unless other causes be superadded, particularly those which consist principally of emanations from decayed vegetable products, leave after them an increased disposition to reinfection. A person who has once had an attack of periodic fever, is more susceptible of infection upon exposure to malaria; and a smaller dose of the poison will take effect.

53. Of the other sources of susceptibility to infection, the most important are — fear and the depressing passions, disorder of the digestive organs, general ill health, and whatever impairs the powers of life. All infectious agents produce a morbid impression on the nervous system, and contaminate the circulating and secreted fluids, with a rapidity, and to an extent, *cæteris paribus*, according to the weakness of vital power and resistance. When the nervous influence and vascular tone and action are insufficient to oppose these agents, the infection then takes effect; the morbid influence extends; the circulating fluids are either early contaminated, or soon become deteriorated; and thus the whole frame is brought, not only under the influence of, but is actually polluted by, the disease.

54. There are other circumstances which predispose to, or increase, the susceptibility of infection; but they are so well known, in respect both of their nature and modes of operation, that they need not be noticed at this place. They are chiefly *extrinsic* to the body; and either precede, or are nearly coetaneous in their action with, the infectious agent. Those which *subsequently come in aid* of this agent, and aggravate, modify, and complicate its mode of operation and effects, have already been alluded to (§ 27.). They will be found more fully discussed in the articles DISEASE (§ 61.), and ENDEMIC AND EPIDEMIC INFLUENCES.

55. VIII. THE MEANS WHICH PROTECT FROM INFECTION, AND COUNTERACT ITS IMPRESSION AND OPERATION, are of the greatest importance, as respects both the science of the physician and the safety of the community. These measures may be divided into — 1st, Those which protect by excluding and destroying infectious agents, or by preventing communication with infectious persons or things; — and, 2dly, Those which are prophylactic, and which guard or fortify the individual against the impression or contamination of infections and contagions. — *The first of these classes of preservative means may be subdivided into* — 1. Quarantine, and the separation of the infected from the healthy; — 2. The exclusion of infected articles, or the destruction of all infection existing in them; — and, 3. The dilution and destruction of the infections floating in the air, or in any other medium.

56. *A. The separation of the infected from the healthy* is the chief means by which a distemper can be prevented from extending. This can be enforced only by governments, and local authorities, when a pestilential or infectious epidemic threatens a country or district. To the neglect or imperfect accomplishment of the measures which belong to quarantine, is chiefly to be imputed the extension of pestilential maladies, particularly in countries bordering on the Mediterranean. The difficulty, however, of putting these measures in force, and the facilities of evading them, especially by the transmission of infected clothes and other fomites, and as regards continental countries having an extended boundary, or populous cities or towns having an extensive communication, are so great, that numerous instances of their infraction must occur, and the chances of the introduction of these maladies be thereby increased. The extension of plague, yellow fever, and pestilential cholera, in different countries, has been entirely owing to the neglect of quarantine and of other means of prevention. If these means could be duly enforced in all their relations, not only those, but other infectious maladies, as typhoid fevers and small-pox, might be either entirely excluded from certain localities, or remarkably limited in their spread, particularly where the situation and boundaries of a place favour the application of these means.

57. Next to the exclusion of infected persons or things from a place, the removal of those first infected to suitable places, where they may be properly treated, and where the extension of the disease is duly guarded against, is of importance. The habitations of infected persons should undergo the processes of cleansing, fumigation, &c., about to be noticed; and all intercouse between the infected house, and those adjoining, ought to be prevented, or placed under certain restrictions. In large commercial towns, and in populous districts, where a strict quarantine or sanatory measures, calculated entirely to prevent a malady from extending, cannot be maintained, the mischief resulting from the attempt will be greater than the benefits which will arise to the community. But where they may be enforced, owing to the nature of the locality and other circumstances favourable to their due maintenance, they should be adopted, notwithstanding the temporary losses, or even distresses, of the place thus sequestered; for the advantages of the few should give place to the safety of the many.

58. As intimately connected with all regulations of quarantine and seclusion, *the duration of the period which elapses from the impression of the infectious agent, to the development of the disease*, should be taken into consideration. On this subject, the information which I have attempted to give (§ 29.) will be found useful. It is obvious that a person may be exposed to a source of infection in one place, and may travel a long distance during the period of formative or smouldering action, and not experience the developed malady until after his arrival in a healthy locality, where he may introduce the infection. In the present day of rapid conveyance, a person may carry an infectious malady, which he has caught in London, to any of the remotest parts of the kingdom, or from almost any European country to this.

59. It is of no less importance to know *the time which a person who has been ill of disease capable of transmission from one to another, retains the power of infection*; but this is a matter of still greater difficulty, even than the knowledge of the duration of the precursory period. The body

itself, probably, loses the power of transmitting a malady, as soon as convalescence is so far established as to admit of free exercise in the open air. Probably a fortnight after the commencement of recovery from most infectious maladies, the power of spreading them has ceased. Where a disease has been communicated at so late a period as this, there is every reason to suppose that the clothes have been concerned in its communication. It is, however, most difficult to assign a precise period with reference to any infectious malady, as its duration will entirely depend upon the personal habits of the individual, upon the ventilation and means of purification resorted to during illness as well as during convalescence, and upon the care taken with his clothes and person. Amongst the lower classes, infection probably continues longer to attach itself to the person than the period now named, owing to circumstances peculiar to them; and there is every reason to believe that it may continue in their apartments or dwellings even weeks and months afterwards, unless disinfecting means be carefully employed.

60. *B.* In many situations, and in several distempers, *the chances of infection by fomites* are much greater than by communication with the sick.—Articles of bedding, feathers, furs, body-clothes, &c., which have imbibed the effluvium of the affected, readily transmit most of the infectious diseases of this country, as well as the pestilential maladies of other countries, to very distant parts. It is astonishing, how long woollen and silken bed and body-clothes will retain the effluvium, so as to affect the healthy by it, when closely packed together, or excluded from ventilation. The animal miasm, which the clothes worn in dissecting rooms have imbibed, will be sensibly perceived many months afterwards, if they have been put in a close place, immediately after they were saturated with the foul air. The necessity of subjecting these articles to ablution, to free ventilation, and to other means of purification, is sufficiently obvious; but, by the lower classes, and even by other persons, all precautionary measures, even those which merely consist of common cleanliness, are most flagitiously neglected, although amongst them those measures are the most requisite. The crowded, low, close, and dirty state of their apartments, and the neglect of ventilation by them in all circumstances, and especially during disease, demand a stricter enforcement of purification, or disinfection, amongst them than elsewhere. Before articles from them or other infected sources are introduced amongst healthy predisposed persons, they should be subjected to the disinfecting agents about to be noticed; and to the perflation of the air in suitable situations, or in places from which the public are excluded.

61. *C. Disinfection.*—During the continuance of an infectious malady in a family or place, it is the duty of the inmates of the one, and of the authorities of the other, to put in force certain *measures of disinfection;* particularly when, owing to the general prevalence or nature of the malady, it may not be deemed requisite to remove the sick to places suitable for their seclusion and treatment. In all circumstances, however, disinfecting means should be employed, as tending, not only to protect the healthy, but also to aid the infected. For it is obvious, that it is much to the advantage of the latter to have the air and clothes, in which they are confined, frequently renewed, and the morbid effluvium removed or counteracted, than to be subject to its concentrated influence during the course of the malady. To dilute, therefore, or to destroy, the infections floating in the air, or attached to any other medium, is a duty we owe both to the sick and to the healthy.

62. *a.* Amongst disinfecting means, a *perflation of pure dry air*, and the abstraction of all sources of humidity, are the most universally beneficial and applicable. These alone prevent several maladies, particularly those which proceed from the sources of infection, ranged under the first and second classes of these agents (§ 4.), from propagating themselves; and when they can be fully enforced, they prevent the extension of most of those distempers, which always proceed from specific infection and contagion. Whatever may be the sources of the morbid effluvium or emanation, dilution by a free ventilation will either weaken or destroy it—at least, so far as to cause it to fail to produce its usual effects. This result will be more certainly obtained when the air is dry. High ranges of temperature, by increasing the humidity of the atmosphere, favour infection, if a very free ventilation is not preserved; and cold, although preventing infection when there is a free circulation of air, often also promotes it, owing to the means used to prevent currents of cold air. This is frequently evinced by the evolution or propagation of infectious diseases in the close wards of hospitals and other places, during winter and spring.

63. *b. Various means* have been resorted to for *the destruction* or *neutralisation of infectious emanations*, especially during the prevalence of destructive epidemics or pestilences. In the desire to establish the efficacy of recently introduced disinfectants, the older means have been undeservedly depreciated. Although the former are the most efficacious, yet it follows not that the latter were devoid of all disinfecting powers. The advantages derived in former times from *fumigations* by camphor, benzoin, myrrh, tar, and terebinthinate substances, and by numerous aromatic, fragrant, and stimulating drugs, were owing to more than one circumstance. These means not only inspired those who used them with confidence, but also in some measure neutralised the operation of the infectious emanation. The fumes from them, and from other exciting and fragrant substances, often counteracted the impression made by the morbid emanation upon the nervous system, by preventing the depression it would otherwise have produced. On this account they may still be resorted to with advantage in some circumstances, particularly in cases of casual or short exposure to infectious emanations, or when it is desired to counteract those which are the less virulent and not generally diffused. When judiciously employed, many of these substances aid the recovery of the sick, especially when the disease is attended by much depression of vital power. Until the discovery of Labarracque's disinfecting fluid, and of the uses of the chloride of lime, they were the chief means that could be employed in the chambers of the sick; those which are next to be noticed, being, from their acrimony, suited chiefly to uninhabited houses.

64. *c. Acids* have long been in use as disinfecting agents, under the impression that they possess the property of decomposing infectious

emanations, or at least of diminishing their virulence. With this idea, the once popular nostrum, well known under the name of "*Thieves' vinegar*," was brought into notice, and even at the present day, under the name of "*Aromatic vinegar*," it is much used by persons exposed to infection, and, I believe, often with advantage. Letters and papers brought from an infected locality are not infrequently dipped in *vinegar*; while clothes and other fomites, transmitted from a similar source of infection, are exposed to the fumes arising from the slow combustion of sulphur, or, in other words, to the action of *sulphurous acid*; but as this latter is found to be injurious to the respiratory organs, and as the powers of the former are too weak to be relied upon when acids are indicated for the purpose of disinfection, the *nitrous* and the *hydrochloric* are those principally used, although not without some risk to the inhabitants of the apartments subjected to their action.—*Nitrous acid* was first employed by Dr. JOHNSTONE and Dr. CARMICHAEL SMYTH. The latter, however, obtained the parliamentary grant for the disputed discovery; and, in 1780, employed this acid to arrest the progress of a fever which was then raging at Winchester, among the Spanish prisoners confined in that city; and subsequently, numerous ships and hospitals, which had become the seat of infection, were exposed to the same agent with success. It may be easily obtained by the combination of nitre and sulphuric acid in proper proportions; and it possesses the advantage of not requiring the aid of heat to effect the development of its fumes.

65. *Hydrochloric acid* was introduced in 1773, by GUYTON MORVEAU, for the purpose of purifying the principal church at Dijon, the emanations from the crowded vaults below having so infected the air of the building, as to render it unfit for public service. This acid was soon afterwards employed with a similar intention in the prison of the same city; and its success in this case also served to establish its reputation. But the application of heat is necessary to procure the evolution of the fumes with rapidity, from the substances from which it is usually prepared. As its use is not without some danger to animal life, it is desirable that no heat should be applied when it is employed to disinfect inhabited apartments, and that the process should be allowed to go on slowly. But, however great may have been the reputation of both the nitrous and hydrochloric acids in times past, they are rarely used in the present day—both being compelled to yield to chlorine.

66. *d. Chlorine* was first brought into notice as a disinfecting agent by M. FOURCROY, in 1791; and was subsequently employed as such, on various occasions, by Mr. CRUIKSHANK of Woolwich, and by M. GUYTON MORVEAU. It has since been used by Dr. FARADAY for the purification of the Milbank Penitentiary; an account of which was published by this celebrated chemist, in the 18th volume of the *Journal of Sciences and the Arts*. Chlorine, for the purpose of fumigating, is most readily and usually obtained, as is well known, by mixing chloride of sodium and the peroxide of manganese, and adding to them a due proportion of sulphuric acid; but as it is extremely irritating to the membrane lining the bronchi and the air-cells of the lungs, when evolved in any considerable quantity, and as it is hence totally inapplicable to inhabited apartments or wards of hospitals, the above process is entirely unavailable on these occasions. To obviate this inconvenience, M. GUYTON MORVEAU introduced a very ingenious apparatus, by which the issue of gas could be regulated at pleasure: but this and all other processes have been altogether superseded by the introduction, by M. LABARRAQUE, of the *chloride of lime* and *chlorinated soda*. There has been, indeed, much discussion as to the chemical nature of these compounds, but this is a subject not requiring notice here; practically it is of far greater importance to know that they are most powerful disinfectants, and that their success has been unequivocal in the most varied cases wherein the use of these agents are indicated. M. LABARRAQUE recommends the *chloride of lime* as the substance best adapted for infected apartments, and considers the *chlorinated soda* as more applicable to foul wounds, ulcers, &c. Both these substances, however, possess the property of preventing infection or putrefaction, and of arresting it when it has commenced; and they may both be used with perfect safety in sick chambers, in the wards of hospitals, and in prisons and other inhabited places. When it is desired to purify any of these apartments, portions of linen, steeped in the solution, should be hung in various places about the room, and the floor and walls frequently and freely sprinkled with it. Some persons, however, with more nicety than discretion, object to the use of these substances, in consequence of the unpleasant odour of chlorine, which they declare to be equally or more offensive than that of the infectious effluvium; but it should be borne in mind, that the existence of the latter is pregnant with danger to those exposed to it, whilst, in the diffusion of chlorine by means of these liquids, there is nothing pernicious to life.

67. Besides cleansing the air, chlorine, and all other purifying fumigations, will have a similar effect on the various solid substances and articles of furniture in the infected apartment. It is prudent, however, in addition to the employment of the above measures, to wash these substances well with soap and water; and as soon as the patient can be removed, the walls of the apartment should be whitewashed, and the room be well and freely ventilated, prior to its being again inhabited. All bed and body clothes removed from a patient labouring under an infectious disorder, should be at once immersed in hot water, or in a solution of an alkaline ley; and after being soaked in either for a considerable time, they should be subsequently hung out in the open air, and occasionally sprinkled with the chlorinated solution. It must not be forgotten, that the beneficial effect of chlorine will be exerted only on a limited quantity of air, and that it is by no means sufficient to correct any epidemic taint existing in the atmosphere of a district or place. When employed, however, in a limited atmosphere, this, and other disinfectants, have proved of no small advantage in checking the spread of infectious maladies; but the power which they possess, is far from being sufficient to preclude the necessity of avoiding unnecessary exposure to the sources of contagion, and of adopting preventive and precautionary measures.

68. *e.* In addition to the forementioned means, an *elevated temperature* has been recommended by

Dr. Henry, as a powerful means of disinfecting fomites, or substances imbued with infectious emanations. The effect of heat has been principally tried in cases of *typhus* and *scarlatina;* and although its power to destroy the infectious properties of the effluvia produced by typhus may be questioned, yet the experiments of Dr. Henry prove that the emanations of *scarlatina* are decomposed or dissipated by exposure, for an hour at least, to a temperature of 200°. And it must be acknowledged that, where heat is of itself sufficient to exert a beneficial influence upon infected clothing and other fomites, it is preferable for this purpose to chlorine, or any other fumigation, being more easily and more extensively diffused throughout the whole of the substances conveying infection. Its use is, however, limited to bed and body clothes, to trunks and packages, and other articles capable of imbibing and retaining the morbid emanation.

69. IX. Precautions against Infection.— Every rational measure to avoid exposure to the infectious effluvia, whether emanating immediately from the bodies of the affected, or mediately from other sources, should be resorted to. Under this head, as strict seclusion as possible, and shunning intercourse with those most likely to have been amongst the infected, are deserving of attention. The predisposing and concurrent causes of Disease (see the article, §23. *et seq.* 61.) should be carefully avoided. Whatever tends, directly or indirectly, to debilitate or fatigue the body—whatever lowers its vital energy, as excesses of every description, low and unwholesome diet, and insufficient clothing, disposes to the operation of the exciting causes of infectious maladies. On the other hand, whatever tends to support this energy, and preserve in their due regularity the healthy functions of the frame, serves to render it impregnable to infectious agents. Exposure to cold, to chills, to the night-dew, to wet, and moisture; the use of cold fluids, and of cold, flatulent, and unripe fruits; should be carefully avoided. If, at any time, exposure to the night-air or to cold and moisture is inevitable, the system should be fortified against them; but the mode of doing this requires caution. It should not be attempted, unless when better means are not within reach, by wines or spirits, and, even then, these should be used in very moderate quantity; otherwise they will leave the system, as soon as their stimulating effects have passed off, more exposed than before to the invasion of infectious effluvia. Medicinal tonics and restoratives, however,— and those more especially which determine the circulation to the surface of the body, at the same time that they improve the tone of the digestive organs, and promote the regular functions of the bowels and biliary system,—may be resorted to on such occasions. For this purpose the infusions or decoctions of bark, of cascarilla, of calumba, &c., with the spirits of Mindererus, or any warm stomachic medicine, or the powdered bark, or the sulphate of quinine, or the balsams, may be taken either alone or with camphor, or with the aloes and myrrh pill, and any one of the spicy aromatics. These medicinal means are especially called for, whenever an infectious malady, of which the individual is susceptible, is present in a town or house in which the person resides; and they should be had recourse to when he retires to sleep, and in the morning before he leaves his room. He should, moreover, avoid sleeping in low and ill-ventilated apartments; and be equally distrustful of sleeping near, or even of passing through in the night-time, close and unwholesome situations and streets, particularly without having resorted to the medicinal means now suggested. (See art. Endemic Influences.)

70. Care should be taken never to be exposed to the morning or night air with an empty stomach. A cup or two of coffee, and bread, previous to such exposures, will be serviceable. The stomach and bowels should be always attended to, and their functions regulated and carefully assisted; but in no case should these objects be attempted by cold, debilitating medicines, such as sulphate of magnesia, or other saline purgatives. The warm stomachic laxatives, or those combined with tonics, may be adopted with advantage, as occasion may require.

71. Particular attention ought to be paid to *personal* and *domestic cleanliness.* The surface of the body should be kept in its natural and perspirable state. The constant use of flannel nearest the skin will be serviceable for this purpose. Excessive perspirations ought to be avoided.

72. The *diet* should be regular, moderate, nutritious, and easy of digestion. Whilst every approach to low living should be shunned, its opposite ought never to be indulged in. The stomach should have no more to do than what it can perfectly accomplish without fatigue to itself, but to the promotion of its own energies. It must never be roused to a state of injurious excitement by palatable excitants, nor weakened by over distention, or too copious draughts of cold relaxing diluents.

73. The *state of the mind* also requires judicious regulation. It ought never to be excited much above, nor lowered beneath, its usual tenour. The imagination must not be allowed for a moment to dwell upon the painful considerations which the disease is calculated to bring before the mind, and least of all ought the *dread* of it to be encouraged. There is a moral courage sometimes possessed by individuals who are the weakest, perhaps, as respects physical powers, enabling them to resist more efficiently the causes of infectious and epidemic diseases, than the bodily powers of the strongest, who are not endowed with this form of mental energy. Those who dread not attacks of diseases, and who yet exercise sufficient prudence in avoiding unnecessary exposure to their predisposing and exciting causes, may justly be considered as subject to comparatively little risk from them. On all occasions, however, a foolhardy contempt or neglect of ailments, especially those affecting the stomach and bowels, ought to be guarded against.

74. During the occurrence of infectious diseases in a family, these precautions are still more imperatively required. A free *ventilation* of every apartment ought to be constantly observed, in conjunction with *fumigations* by means of aromatic substances kept slowly burning, or by the vapours of chlorinated soda or chloride of lime. If a quantity of a very weak solution of chloride of lime be put in a vessel, and some hydrochloric acid be poured upon it, and be placed in the hall, or the very lowest parts in a house, the disengaged gas will soon find its way in sufficient quantity to the higher apartments. The attendants on the

sick should particularly observe the measures now prescribed; and ought never to exert their attentions on the affected, so near their persons as to inhale their breath, or the effluvium emanating from them, without at least fortifying the vital energies in the way pointed out; and they should carefully avoid entering upon those duties with an empty stomach, or when fatigued.

75. Besides burning warm aromatic substances, and odoriferous gum-resins, in the apartments, and in those adjoining them, in which affected persons are or have been confined, solutions of chlorinated soda, or of the chloride of lime, or a saturated solution of camphor in aromatic vinegar, or in the pyroligneous acid, should be occasionally sprinkled on the floors, furniture, and bed-clothes. These means, with a thorough ventilation, and a due attention to cleanliness, will not only counteract the influence of the effluvium proceeding from the affected, and ward off its action even on the predisposed, but will also prevent the clothes, bedding, or furniture of the apartments of the sick, and the clothes of the attendants, from becoming imbued with it, so as to communicate the malady. They are within the reach nearly of all; and in the event of the extension of a pestilential infection or epidemic to any considerable town or city, if care were taken to see them put in practice, under the direction of medical councils of health, one of which should be formed in each district or quarter, much good would result from them. Keeping in recollection the principle which I have endeavoured to establish, — that the excitingcause of infection undoubtedly makes the first impression on the nerves of the lungs, — the advantages of those measures, from the circumstance of their being applied especially to this organ, must be obvious.

76. When a contagious substance has been accidentally applied to a wounded or to an abraded part, means to prevent its absorption, or contaminating influence, should be instantly resorted to, appropriately to the situation, and to the nature of the contagious principle. Ligatures above the seat of injury, and suction of the part, should be instantly employed; and ablution with a strong acid solution, — with muriatic and nitric acids, or with both, — the application of spirits of turpentine, of the nitrate of silver in substance, or in a strong solution, and similar measures, ought subsequently to be adopted. In cases of the inoculation of the virus of *rabies*, excision of the injured part should precede these means, when it can be performed. At the same time, the promotion of the digestive functions and of the constitutional powers, by the treatment already advised, will materially aid the local applications in preventing the development of disease.

77. X. TREATMENT WHEN SYMPTOMS OF INFECTION APPEAR. — When a person has been exposed to the sources of infection, and particularly when the symptoms I have described, indicate that infection has actually taken place, and that the disease is in the course of development, *are* there any means which will prevent its evolution, or render its course more mild, if prevention cannot be accomplished? I believe that a treatment may be adopted, which will often succeed in preventing, or in mitigating, the disease; and that these ends will frequently be attained in respect of several infectious maladies. There are some, however, which cannot be arrested after infection has taken place, or after the symptoms characterising the formative or precursory stage have appeared. Small-pox, and probably plague, scarlet fever, and measles, seem to be the chief maladies which may not be prevented from developing themselves after infection has made the full morbid impression on the economy.

78. In order to arrest the progress of infection, it is necessary to keep in recollection the conclusions as to the operation of infectious agents on the system, that may reasonably be drawn from observations, both pathological and experimental. These conclusions, as furnishing a basis for remedial indications, may be limited to the following: — 1st. That the *more immediate impression* of infections is made upon the nervous system of organic life. — 2d. That this impression is of a sedative or *depressive* kind. — 3d. That infectious agents not only *depress*, but also *modify* or *alter* the vital influence in a special manner, or, in other words, each infectious agent produces a peculiar or specific depressing effect. — 4th. That the vascular system and circulating fluids soon experience the effects of this impression; and that the action of certain infections and contagions are earlier displayed on this system, in respect of some contagions, than as regards others. — 5th. That the circulating, secreted, and excreted fluids undergo a consecutive and progressive change. — 6th. That the impression on the organic nervous and vascular systems, and the consecutive changes in the fluids, ultimately affect and impair the vital constitution and cohesion of the soft solids. — 7th. That, as an infectious agent exerts a depressing or sedative, as well as a special or peculiar, morbid impression, it is reasonable to infer, that whatever tends to increase the nervous power, will enable the energies of life to resist the morbid impression, to prevent the progress of contamination, and often ultimately to remove both their immediate and remote effects.

79. Conformably with these views, I have, on numerous occasions of exposure to infectious agents, advised a *restorative* and *tonic treatment*, with strict attention to the *prophylactic means* just advised. These should be continued for a period at least equal, and in most cases beyond, that which is required for the development of the disease. In many instances, this treatment should be preceded by an *emetic*, which may be conjoined with some warm or stimulating substance. A warm *stomachic purgative* should afterwards be exhibited; and hot diluents, with camphorated or aromatic substances, may also be given. The energies of life ought to be promoted by means suited to the habits and circumstances of the individual, particularly by tonics or light nutritious diet, and pure dry air. When the infectious agent produces, at the period of exposure to it, a sensibly depressing and morbid operation, it will be often of service to excite, as soon as possible, an artificial febrile commotion in the system, and to promote the secretions and excretions. The excitement will overcome the depressing effects, and the promotion of the secretions and excretions will preserve the blood in an uncontaminated state. Much, however, will depend upon the employment of the means appropriately to the condition and circumstances of the infected person.

80. When the primary operation of infectious

agents is characterised by great vital depression, it is surprising how large doses of tonic and restorative substances may be taken before this state is removed. A lady of a delicate constitution, usually unable to take more than two glasses of wine after dinner, without occasioning heat and discomfort, was exposed to concentrated effluvia of the exanthematic typhus now prevalent. She felt an unpleasant odour, followed by a sudden loss of strength, nausea, and all the symptoms indicative of infection in a severe form. Her spirits were depressed; she stated her conviction that she had caught the infection, although she had approached it without any dread; gave directions as to her affairs, and resigned herself to her bed. I found her, with a weak, irregular pulse, slow and very compressible. The countenance was very pallid, and the mental and corporeal depression was extreme. — I prescribed camphor in the form of pill, and the decoction of cinchona with the compound tincture, the tincture of capsicum, the chlorate of potash, and carbonate of soda, in full and frequent doses. In the intervals, wine was given freely in the form of negus, a bottle being taken in the twenty-four hours in this form. These means were persisted in for two days, before the powers of life rallied; when a free and general perspiration broke out, and restoration quickly took place.

81. Of four persons who were exposed to the concentrated emanations of typhus, three of them were seen by me soon afterwards, owing to the appearance of symptoms of infection. They were all treated upon the same principles; sulphate of quinine and camphor in full doses, and as much purified extract of aloes as was necessary to keep the bowels open, were given every three or four hours, in two of these cases. The three, thus treated, soon ceased to experience the precursory symptoms. The fourth of these exposed persons was an aged female, and hence much less susceptible of typhus infection than the three young persons who had evidently caught the infection. She escaped, but carried the infection to her son and daughter. I might adduce numerous other proofs of the success of treatment during the period which elapses from exposure to infection, till the full evolution of its effects, if my limits could admit them. But I have advanced enough to show that appropriate means will often succeed in preventing the most severe and dangerous consequences, both to the person who has been exposed to infection, and to him who is experiencing its incipient or earlier effects. (*The above article is the substance of the Gulstonian Lectures, delivered by the Author at the Royal College of Physicians, in May*, 1838.)

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INFLAMMATION. — SYN. Φλόγωσις (from φλοξ, a flame), Φλεγμονὴ (from φλέγω, I burn), Φλέγμα, Φλέγμασια, Gr. *Inflammatio*, *Phlogosis*, *Phlegmone*, *Phlegmasia*, Lat. *Entzündung*, Germ. *Inflammation*, *Phlegmasie*, Fr. *Inflammazione*, Ital.

CLASSIF. — 1. *Class*, Febrile Diseases; 2. *Order*, Inflammations (*Cullen*). 3. *Class*, Diseases of the Sanguineous Function; 2. *Order*, Inflammations (*Good*). III. CLASS, I. ORDER (*Author*, in *Preface*).

1. DEFIN. *Alteration of the vital actions of a part, manifested by morbid sensibility or pain, by redness, increased temperature, and swelling, generally with more or less febrile commotion of the system.*

2. *Inflammations* or *phlegmasiæ* constitute one one of the most numerous classes of disease, and appear the most frequently in practice. They are the most common sources of structural lesions, whilst they are, in their developed states, them-

selves lesions of organisation, yet originating in changes which are not at first, although they rapidly become more and more, manifest. They are thus intermediate states between disordered vital action, and change of structure; retaining, however, the characteristics of the former condition, even when they have superinduced the latter. They may be seated in any organ of the body, and in any tissue, excepting the cuticle, hair, and nails; but certain structures or parts are much more frequently affected by them than others. The phenomena characterising inflammations; the changes in the circulating and secreted fluids attending them; the effects produced by them locally and constitutionally; the remarkable variations these effects present, with the state of the system, and with the exciting causes; and the almost universal liability of the tissues and organs to their invasion; combine to impart the utmost interest and importance to the investigation of their *nature* and *treatment*.

3. In treating of this subject, I shall describe — *First, the phenomena, local and general, constituting inflammation of a sthenic form*, or as observed in a previously healthy person, with *their course, and terminations*, or consequences; — *Secondly, the varieties or states inflammation assumes*, owing to certain predisposing, exciting, and concurrent causes, to the previous condition of the patient; to morbid associations; and to the tissues affected; — *Thirdly, the causes, and pathology, or rational theory, of inflammation*; — and, *Fourthly, the treatment*, with reference to the different forms, states, and complications of the disease. Under one or other of these heads, I hope appropriately to introduce every thing of importance connected with the *causes*, *nature*, and *treatment* of this most important, most common, and but imperfectly understood, deviation from the healthy state.

4. I. OF THE PHENOMENA CONSTITUTING STHENIC INFLAMMATION, AND OF THEIR COURSE AND TERMINATIONS.—It is necessary, in order to form a satisfactory view of inflammation, to consider first, its phenomena, as manifested in a previously healthy constitution. It then presents characters which have been variously denominated, in order to distinguish them from those which attend inflammation occurring in previously disordered frames, as the *adhesive*, *phlegmonous*, *healthy*, *reparative*, *sthenic*, &c. — I have preferred the last of these terms, as it is more appropriate to most of the states in which this species of the disease presents itself. As *sthenic inflammation* occurs both in acute or active, and in slighter or more chronic forms, I shall describe it accordingly, but with due reference, to the succession of one to the other, — to the usual procession of the morbid phenomena of each, — to the effects upon the circulation and secretions, and to the ultimate results.

5. i. OF ACUTE STHENIC INFLAMMATION. — *A. Local Characters.* — In this, which may be denominated the truest or the most unequivocal form of inflammation, there is an *increase of the vital actions*; but this increase must be of a certain duration, and the vital actions must be altered in character as well as in degree — must be truly *morbid* — as I have contended in the article DISEASE (§ 87. *et seq.*), to constitute inflammation, and to distinguish it from the vital turgescence which is temporarily produced by local stimuli, or even by mental excitement. The true seat of inflammation is always the ganglionic nervous system and the capillary vessels of the part affected; the primary change, as will hereafter be more fully shown, originating with the former, but more fully expressed in the latter, constituent of the organisation.*

6. *Acute sthenic inflammation* commences with increased or *altered sensibility or pain* of the part, to which soon succeeds *redness*, from increased vascularity — from the enlargement of vessels. The *temperature* of the part is raised, the *functions* disturbed, the *secretions* at first interrupted, and subsequently changed; and swelling takes place. These phenomena are always present in a more or less remarkable manner, or in different proportions, and are much augmented when the system sympathises, and febrile action is developed. Neither of these constitutes inflammation when existing singly; and but four of them have generally been considered requisite to its existence, namely, *pain*, *redness*, *heat*, and *swelling*. *Disturbance*, however, *of the functions* and *disorder of the secretions* of the part, are constantly present, and are as much constituents of the disease as are those more generally conceded to it. To these, *the local symptoms*, it will be necessary more particularly to advert, before the *constitutional disorder*, consequent upon the local affection, is considered.

7. *a. Uneasy sensation, from its lowest grade, until it amounts to acute pain*, is the primary symptom following the operation of the exciting cause, or characterises that kind of excitement, or deranged influence of the ganglionic nerves forming the first series of the changes in the affected part, and it is heightened or kept up by the alteration thereby induced in the action of the capillaries. When the uneasy sensation amounts to pain, it is owing either to the degree of change in the organic nervous fibrillæ, or to the communication of the morbid excitement, originating in these nerves, to the terminations of the cerebro-spinal nerves, with which they are associated in the tissues. The pain, therefore, of inflammation originates in, or arises from, a change in the state of the particular influence exerted by the organic nervous fibrillæ of the part; this change deranging the action of the capillaries supplied by these fibrillæ, and often exciting or otherwise disturbing the sensibility of the associated cerebro-spinal nerves. That the extension, however, of the morbid change to the latter nerves is merely contingent, is shown by the slightness of the pain, or by the absence of acute pain in many cases of severe inflammation of internal viscera, particularly those which are not supplied by these nerves; and that the morbid sensation originates in the organic or ganglial nerves, and not in the cerebro-spinal, is rendered probable by the circumstance of the most acute pains which are clearly referable to the latter class of nerves, as those of neuralgia, trismus, and other spasmodic affections, not being attended by inflammation.

8. The *uneasy sensation* is the sensible mani-

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* I may here state, that this and other views connected with the pathology of inflammation were published by me, first in 1815, and subsequently in 1820, 1822, and 1824, in the works referred to in the Bibliography. It is the more necessary to state this, as several of these views have been adopted by later writers, and brought forward with an air of originality to which they have no claims.

festation of the primary change in the organic nerves of the part, — of that change, which induces the vital expansion, or turgescence of the capillary vessels, and the consequent increased influx of blood. The morbid sensation is afterwards increased to *actual pain* by the circumstances just stated (§ 7.), and by the excessive expansion and tension taking place in that part. It differs in severity and character according to the degree of inflammation, and to the sensibility and structure of the affected part. It often consists of soreness or aching, — of pricking, itching, tickling, tension, heat, or burning, — of painful throbbing, tearing, darting, gnawing, &c.; and in parts abundantly supplied with nerves, particularly with the nerves of sensation, it is most acute. In mucous, cellular, and parenchymatous structures, the pain is rarely very severe. The substance of the brain, or of the lungs, or of the liver, or of the kidneys, is often acutely inflamed without sensibility being materially excited. Severe pain in these diseases is owing either to the extension of inflammation to the serous or fibrous structures, or to the tension of these tissues caused by the swelling of the parts they inclose. Unyielding and dense textures, as the fibrous, serous, and fibro-cartilaginous, are generally the most painful when acutely inflamed. — Pain does not always represent the true seat of the disease. In cases of partial inflammation of the substance of the brain, pain may be felt only in some remote part of a limb, or in a part of the scalp. During inflammation of the substance either of the lungs, or of the liver, or of the kidneys, or of the uterus, pain may be felt only in those ramifications of the cerebro-spinal nerves, which are most intimately related to the organic nerves of the affected part, as in the vicinity of the clavicle or shoulders, in the limbs, &c.

9. It is necessary to study, not only the severity and character of pain, with reference to the existence of inflammation, but also its types or modes. The uneasy sensation attending inflammation is generally constant; and, although often exasperated at times, it is never altogether absent. Even when no pain is complained of, as often occurs in inflammations of internal viscera, tenderness to the touch, or to pressure, is generally present. When, with continued pain, or with a sense of soreness, aching, or of throbbing synchronous with the pulse, or of heat, more or less constant, there are tenderness on pressure, and increase of the morbid sensation on exercising the functions of the part, inflammation may be inferred, even when other indications of it are absent. But the most severe pains, without tenderness, or with perfect tolerance of pressure, and especially if they are paroxysmal, and attended by complete intermissions, furnish no evidence of inflammation.

10. *b. Redness*, of itself, is not sufficient to indicate inflammation. It may arise from active congestion of the capillaries, or from a vital turgescence of only temporary duration. On the application of an irritant, redness of the part is not manifested immediately, although uneasy sensation is induced; but it soon is developed owing to the morbid excitement of the nervous fibrillæ, and like this morbid state, it is more or less permanent. The redness which has thus arisen is caused by the vital expansion of the capillaries, and by the admission of a larger current of blood into them, and of the colouring globules into a series of vessels which did not formerly admit them. The blood also, during the sthenic state of inflammation, becomes somewhat more florid than usual, in the capillary vessels. The redness is generally greatest in the centre of the inflamed part, or in that spot in which the irritation originated; but it spreads more or less, and is gradually lost in the surrounding tissues. The colour varies in depth or hue with the progress and form of inflammation; but, in the species now being considered, it is more or less florid or deep. In very vascular, or highly organised parts, the tint is deepest, owing to the more intense state of action.

11. Increased redness of a part may exist, as just stated, without inflammation. In order to impart to it essentially inflammatory characters, the vascular action from which the redness proceeds must not only be excited, but also otherwise changed from the healthy state. It must be rendered truly morbid. Stimuli or mental emotions will produce redness, but this redness is not inflammatory; it soon disappears, and gives rise to no consequences or lesions. The excitant or irritant must, from either its continued or its peculiar action, change or vitiate, as well as excite, the organic nerves of the part,—must impart to them a *truly morbid state* or influence, which similarly effects the vital actions of the capillaries, not merely exciting, but also modifying, that action, so as to give rise to effects very different from those observed in health. In this respect, chiefly, the redness of inflammation differs from simple vascular excitement, or injection or congestion. In this latter state, the vessels are distended, and contain more than their usual quantity of blood, the circulation through them varying in activity, — either rising above, or sinking below, the common grade of celerity. This state, to which only the very loose and often inappropriately employed term, *hyperæmia*, recently introduced into pathological discussions, is applicable, is, however, very different from true inflammation, although it may be readily converted into some one of the varieties of inflammation. It is unattended by that morbid state of the organic nerves of the part, upon which the true inflammatory action of the capillaries depends. However denominated, whether *congestion* or *hyperæmia* — or however qualified by the prefix *active* or *passive*, it forms no essential part, and constitutes no particular stage, of sthenic inflammation, as supposed by some recent writers.

12. If we trace *the course* of the vascular disturbance, we shall find that a contraction of the capillaries of the part follows upon the application of an irritant, and upon the change produced in the organic nerves of the part. The contraction is soon followed by a reaction or vital expansion of these vessels, an increased afflux of blood, and the other phenomena of the excited vital process. The veins receive the blood from the minutest ramifications of the capillaries, in such a manner as naturally to retard the capillary circulation in them. Consequently, when the action of the capillaries is morbidly increased, expansion of these vessels, and an excessive accumulation of blood in them, must necessarily follow; for the veins are incapable of receiving, and carrying onwards with sufficient rapidity, the quantity of blood sent to them. Owing to this circumstance, vessels pre-

viously admitting only the colourless blood, become expanded, so as to admit the red globules; and as the morbid process goes on, new vessels are probably developed; the blood also becoming, and continuing to be, more florid, as long as the sthenic action persists.

13. *c. Increased heat*, as well as augmented redness, is the result of the morbidly excited action. Experiments, however, with the thermometer, show that the warmth of inflamed parts is not so great as the sensations usually indicate. — Some writers, as HUNTER, ABERNETHY, MAYO, and others, contend, there is actually no increase of the temperature above the healthy standard; but such is not the case. The temperature of an inflamed part upon, or near the surface, is usually several degrees higher than that of parts at some distance from it; and even the deep-seated viscera experience a rise of two or three degrees, and often much more, above the healthy temperature of 98°. The existence of heat, even with increased redness, is not an unequivocal symptom of inflammation; for it may depend upon temporary or healthy excitement merely. It is necessary to be continued to indicate a morbid state of action. Moreover, it may be so slightly augmented as to escape notice.

14. As to *the source* of heat in inflamed parts, some difference of opinion has existed. — Since CRAWFORD proposed the theory of the dependence of animal heat upon the different capacities of venous and arterial blood for caloric, the warmth of these parts has been imputed by many to the quantity of blood circulating through them, and passing from the arterial to the venous state. Without occupying my limits with the opinions and discussions as to animal heat, I may remark, that Sir B. BRODIE considered, from his experiments, that the cerebro-spinal nervous system was instrumental in its production. This opinion, however, was not confirmed by the researches of LEGALLOIS, W. PHILIP, and HASTINGS. In 1820, 1822, and 1824, I published my views on the subject (see *Lond. Med. Repos.* vol. xvii. p. 370., and *Appendix* to RICHERAND's *Elements of Physiology*, p. 630.), and contended that animal heat is not the result of the difference of capacity existing between venous and arterial blood; for, as Dr. DAVY has shown, this difference is not sufficient to explain the phenomenon, although it may be subordinately concerned in producing it. I then stated, that the various causes, which modify the production of animal heat act — 1st, immediately upon the organic system of nerves; — 2dly, upon the blood; — and, 3dly, through the medium of the cerebro-spinal system, modifying the influence which this system imparts to the ganglial. I then viewed animal heat more as a vital secretion than as a chemical phenomenon, — as proceeding from, and as being controlled by, the influence exerted by the ganglial system of nerves upon the vascular system and blood; and the subsequent researches of CHOSSAT and EDWARDS obviously confirm this opinion. Conformably with this view, I have stated, in the works referred to, that the increased heat of inflammation is derived from the same source, — from the influence of the organic nerves upon the vessels of the affected part, aided by the increased circulation through the capillaries; the nervous influence enlarging these vessels, or occasioning an erectile state of them, and thereby soliciting an afflux of blood to the part. The increased temperature of erectile tissues, consequent upon irritation of their nerves and expansion of their vessels, fully illustrates this theory of animal heat, and particularly with reference to inflammation.

15. *d. Swelling* has been assigned above as one of the changes constituting inflammation. But, from what I have already stated, it should be viewed rather as a consequence of this act, than as an essential part of it. Besides, swelling is not always present, owing to circumstances about to be noticed. The morbid state of the organic nerves and the expansion of the capillaries are the earliest causes of swelling. But, as the diseased action proceeds, a more or less copious exudation of serum into the areolar tissue takes place; a portion of the serum and even of the red particles of the blood passes through the pores or distended walls of the capillary canals, especially in cellular or mucous tissues, distending, tumifying, and thickening the inflamed part. Hence the areolæ of cellular structures are found filled with a serous, sero-albuminous, and often with a sanguineous fluid, in which flocculi are sometimes seen floating, or adhering to the parietes of the areolæ or cells; these parietes being often thickened.

16. The *nature* of the swelling entirely depends upon the state or kind of fluid thus exuded from the inflamed capillaries. — The *state* of the fluid depends upon the kind of disorder of the organic nervous influence of the part, and of the constitution generally, and upon the degree of vital power exerted by the system. — In the *sthenic species* of inflammation, this power, however much it may deviate from the healthy condition, is at least not depressed below this condition. The fluid exuded is therefore a product of increased or sthenic vascular action, excited and kept up by the influence exerted on the capillaries by the nerves in which the disorder originated. Hence it is generally sero-albuminous, or a mixture of serum and coagulating lymph, sometimes containing colouring particles when the morbid action is intense; and the consequent swelling is firm, tense, and limited as to extent. The sero-albuminous or coagulating character of the effused fluid entirely depends upon the sthenic nature of the inflammation, and is of the utmost importance as respects the subsequent changes. When the organic nervous or vital power, locally or generally, is depressed, or otherwise vitiated as well as depressed, the effused fluid is not albuminous, and does not coagulate. It is then either serous, or sanguineous, or even sanious; and does not possess the characters of coagulable lymph. The consequent swelling is œdematous, soft, diffusive, or spreading, owing to the fluid state of the exudation, and its more ready infiltration into the surrounding parts. Whilst organic nervous or vital power is unreduced, the exuded matter occasioning the swelling in the advanced stage of inflammation, at least partially coagulates, and limits the extension of tumefaction. But when this power is much reduced, or greatly vitiated, as in the different forms of *asthenic* inflammation, this matter retains its fluidity, infiltrating and infecting the surrounding tissues.

17. The existence and amount of swelling chiefly depends upon the nature of the inflamed tissue. It is neither so early nor so obviously present in inflammation of dense structures, as in

that of soft and yielding parts. It is inconsiderable in fibrous, fibro-cartilaginous, and serous tissues, and is hardly apparent until the morbid action has continued for some time. In cellular, mucous, and parenchymatous tissues, the swelling is early and considerable. In certain parts, as in cellular tissue bound down by aponeurotic expansions, and in the internal structure of organs surrounded by fibrous or unyielding membranes, the swelling is less, or more slowly developed; the pressure thus occasioned restraining the effusion and the expansion of the capillaries. But, where the morbid action is intense, the pressure gives rise to a most distressing sense of tension, interrupts the functions of the organ, and sometimes even the circulation in it, thereby destroying its vitality and occasioning dissolution. When the substance of the brain is inflamed, the nature of its circulation, the great division and tenuity of its capillaries, and the unyielding nature of its surrounding structures, combine to prevent it from becoming much swollen. Yet there is every reason to believe that more or less swelling actually occurs (see art. Apoplexy, and Brain — *Inflammation of*), and that the pressure on the inflamed organ, occasioned by the unyielding parts surrounding it, gives rise to the more dangerous symptoms observed in the advanced progress of the disease.

18. *e.* The *functions* of an inflamed organ, tissue, or part, are, as Mr. Morgan has very justly contended, more or less disordered; and I may add, that the disorder is one of the earliest phenomena or constituents of the morbid action, being nearly coëtaneous with the change in the organic nervous power, on which this action depends. The disturbance of the functions is generally in proportion to the violence of the disease. If the inflamed part performs a secreting function, the secretion is either diminished, increased, or altered in character. — *Diminution* of this function is observed, when the cutaneous surface is inflamed, at the commencement of acute inflammation of serous and mucous membranes, and when the morbid action in glandular secreting organs is sudden or intense. When parts near the surface are inflamed, perspiration is obstructed, and the temperature is thereby increased. It is only at the commencement of inflammatory action in serous and mucous surfaces, that their secretions are diminished: as the disease proceeds, their secretions become increased, but at the same time changed in their characters; the change varying with the intensity, form, and duration of morbid action, and with the state of the patient. Inflammation of glandular organs is generally attended by suspension or diminution of their secretions, as in hepatitis, nephritis, &c. But in many cases, one kidney only, or a portion of the liver, may be inflamed, the secretion being only diminished or somewhat altered. It should, however, be recollected, that the secretions of an organ may be suspended, increased, or morbidly affected, otherwise than by inflammatory action.

19. The lesion of function attending the commencement of inflammation obviously depends upon the primary affection of the organic nerves. That accompanying the advanced progress of the morbid action proceeds not only from this source, but also from the alteration in the capillary circulation, from the consequent effusion of lymph in the inflamed tissue, and from the swelling and mechanical obstruction thereby produced.

20. The *throbbing* is connected with the obstruction to the return of blood, particularly from the expanded capillaries, into the veins. It is synchronous with the pulse, and is caused by the injection of blood into the part on each contraction of the left ventricle of the heart. It increases and renders the pain pulsatile; when it occurs at an advanced stage of inflammation, it is usually soon followed by suppuration. It is increased by a depending position of the inflamed part, and by whatever either obstructs the return of blood from, or favours the flow of it to, the seat of disease.

21. *B.* Of the Local Appearances after Death. — Certain of the preceding local characters of inflammation necessarily disappear with the termination of life; and the rest, as redness and swelling, either vanish, or remain for some time afterwards.—*Redness* does not always continue after death; its absence, therefore, is no proof that inflammation had not existed during life. Its presence also, *post mortem*, is not sufficient evidence of its dependence upon this cause. At an early stage of inflammation, and before the capillaries have lost their vital tone or contractility, and before much serum or lymph has been effused, redness generally disappears after death. Even when much effusion of fluid, and other changes consequent upon the morbid vascular action, have taken place, the blood may have entirely forsaken the vessels before the parts have been examined. Where redness actually exists, much discrimination is necessary to determine, whether or not it has proceeded from inflammation, or from a dependent position, or from transudation of the colouring matter of the blood from the vessels, or from incipient decomposition. It may arise from either of these. In many cases, two or more combine to produce it: a depending position favours both the gravitation of the fluids in the vessels, and the exudation of the colouring particles in the lower parts. The injection caused by position more readily occurs in parts which have been inflamed, than in those previously sound. Much, however, depends upon the seat and form of inflammation, and upon the circumstances connected with dissolution. Next to position, obstructed circulation through the heart or lungs, or obstruction to the return of blood in the veins, most frequently occasions non-inflammatory injection and redness, particularly in mucous surfaces; but, in such instances, the redness is more or less general or diffused in these parts, or exists in situations remote from each other, and is not attended by the usual products of inflammation. Attention to the circumstances causing redness of parts after death will generally enable the practitioner to infer with accuracy its dependence upon inflammation. When it is associated with any of the usual products or consequences of this disease, as the effusion of lymph, or of a sero-albuminous fluid, with softening, swelling, &c., then no doubt as to its origin need be entertained. (See *Diagnosis.*)

22. *C.* Of the Constitutional Symptoms or Effects of Sthenic Inflammation. — The constitutional phenomena vary remarkably with the exciting causes, the intensity, and the seat of inflammation; and they are further modified by age, habit of body, diathesis, and epidemic constitution.—When inflammatory action takes place in

a previously healthy person, and from causes which do not materially vitiate or depress the vital powers, or contaminate the circulating fluids, the constitutional effect presents certain features which are rarely wanting. It has been variously denominated, as *Symptomatic Inflammatory Fever;* —*Sympathetic Synocha;*—*General vascular Reaction;* — *Inflammatory Fever*, &c.; and has been improperly described in connection with, or rather as a species of, true fever. Indeed, some writers, as I have shown in the article FEVER (§ 91.), particularly CLUTTERBUCK, MARCUS, and BROUSSAIS, have contended that the *constitutional affection*, produced by the local changes constituting inflammation, is in no respects different from *idiopathic fever*. In the article just referred to, I have stated sufficient to prove the very remarkable differences between the two (§ 26—30.); and I shall hereafter succinctly notice the subject. Indeed, the former is altogether distinct from the latter, and should not be considered in connection with it, further than to point out the diagnosis.

23. In some constitutions, particularly the sanguineous, the irritable, and the nervous, the local lesions described above (§ 6.), very soon after their commencement, create more or less constitutional disturbance and febrile commotion; whilst in others, as the phlegmatic or lymphatic, the melancholic or bilious, these lesions may have been of some continuance, or have proceeded far, before general disorder is developed, or becomes severe. The local change being the same, the constitutional effect will vary remarkably in grade, form, and course, according to these and other circumstances just mentioned. In some, it will be rapidly developed; in others, slowly, or after a precursory period of longer or shorter duration, or after several efforts to produce it. The earlier constitutional symptoms are often neglected by the patient, and are seldom subjected to the physician. Occasionally the patient experiences chills or rigors more or less severe, almost immediately after sensations of pain or uneasiness. In rarer cases, morbid sensation is not produced, until either during, or after, the rigors. This is observed most frequently in inflammations of internal organs. More commonly the patient complains, in connection with pain, of uneasiness, or other morbid states of sensation referrible to a particular part, of weakness of the limbs, lassitude, general uneasiness, or lowness of spirits, of slight chills, formication, or of an alternation of slight chills and flushings. These may be the only precursors; or they may be attended by disturbed sleep, a whitish or loaded tongue, a clammy state of the mouth, with vitiated taste, want of appetite, constipation, &c. With these, the local symptoms are aggravated, and severe rigors or shudderings are more or less rapidly produced. The rigors are sometimes accompanied with nausea or vomiting. The countenance, general surface, and extremities, which were pale, harsh, or cold, during the rigors and chills, soon afterwards become warm; and the pulse, which was previously small or constricted, and but little accelerated, increases in quickness and volume. The consequent phenomena appear with a rapidity and severity, varying with the intensity and extent of the local action. The secretions and excretions are diminished, and subsequently vitiated. The skin is hot and burning, the face flushed; the tongue is white, furred, or loaded, and, with the mouth, somewhat dry or clammy; the appetite is gone; thirst is urgent; the bowels are constipated; the urine is scanty, high-coloured, clear, and emits a strong odour; and pains are often felt in the back, or loins, limbs, or head, in addition to those referred to the inflamed organ. The symptoms indicate general vascular excitement and its usual consequences, unconnected with depression of vital power, or contamination of the fluids. When they are severe or intense, and when the energies of life become exhausted, delirium sometimes takes place, particularly at night; but it rarely appears early, unless the brain is the seat of inflammation, or readily sympathises with the local affection, as in inflammation of the diaphragm or of fibrinous parts.

24. The acuteness of the general symptoms is not always in relation to the severity of the local changes; but, according to the intensity of either, or of both, will the type of the former be more manifestly continued. The less severe states of constitutional affection, and particularly when the local morbid action is neither extensive nor very acute, are characterised by exacerbations in the evening or night, during which the local symptoms are more or less exasperated; restlessness and want of sleep being generally present. In the morning the symptoms are ameliorated, and a tendency to perspiration appears. The course and duration of the constitutional affection vary with the severity and the seat of the local disease, and with the circumstances proper to the individual affected. The symptoms usually increase either gradually or rapidly, according to the nature of the exciting causes, the acuteness of the attack, and the circumstances just alluded to, until they arrive at a certain pitch or *acmé*, from which they decline more or less rapidly in some cases, and slowly in others. This change, whether taking place gradually and slowly, or suddenly and rapidly, depends entirely upon the state of the local affection. If the local symptoms gradually decline, the general disturbance subsides in a similar manner; and if any of the more unfavourable terminations of the local disease about to be noticed occurs, the system evinces the change, as will be hereafter stated.

25. *D.* OF THE CHANGES OBSERVED IN THE BLOOD IN STHENIC INFLAMMATION. — These vary remarkably with the circumstances determining the severity, seat, and course of the disease. I have described them so fully in the article BLOOD (§ 96. *et seq.*), that little more need be here adduced upon the subject.—Much importance has been attached to the existence of a *buffy coat*, and of a *cupped* appearance of the coagulum. These states of the blood are most frequently observed in the species of inflammation now being considered. But they are not always, nor even very generally, present, nor at all stages of the disease in which they occur. They are even more commonly met with in some complaints which, although nearly allied to inflammation, are not purely inflammatory, as rheumatism. They have frequently a marked reference to the stage and seat of inflammation. In acute rheumatism they are very remarkable, and often become more so as depletions are repeated. I once witnessed a case of the internal metastasis of rheumatism, for which venæsection was repeated several times. The buffed and cupped appearances became more and more remarkable; and yet, upon examination after death,

no signs of inflammation could be detected, and the internal viscera were quite bloodless. When, however, serous and fibrous structures are inflamed, these states of the coagulum very generally exist. During acute inflammation of cellular and mucous tissues, they are much less frequently observed. When compound or parenchymatous structures are inflamed, they are met with chiefly in certain stages and states of the disease. When an important or vital organ is inflamed, and especially when the patient is plethoric, and the circulation oppressed, these appearances often do not take place until the vascular load and oppression are removed, and the circulation is rendered free. There are various other circumstances which affect the state of the coagulum in acute sthenic inflammations, but they are noticed in the article just referred to. It is chiefly in the venous blood that *cupped* and *buffed* appearances have been seen; for the occasions of noticing them in arterial blood are comparatively rare and unfavourable to their occurrence. They have, however, been met with in arterial blood by Gordon, Gendrin, and others.

26. *The coagulation of the blood,* and the origin of the buffy coat of the coagulum, have been so fully considered elsewhere (see art. Blood, and my *Appendix* to Richerand's *Elements of Physiology,* p. 638.), that I need adduce but little further on the subject, than to state the facts ascertained, and the inferences deduced, from my investigations, and published in 1824, in the first edition of the *Appendix* just mentioned. — The blood during life consists of serum, holding in suspension small regular and insoluble globules, each of which is composed of a central colourless spheroid corpuscle, and a coloured envelope. The latter always continues to surround the former during life; but, as life departs, and as the motion to which it gives rise ceases, the attraction between the central corpuscles and their coloured envelopes no longer exists, the one completely separating from the other. The central corpuscles then obey the force which tends to unite them, and form a network in whose meshes the liberated colouring matter, now detached from these corpuscles, becomes inclosed, and thus the coagulum is formed. These central corpuscles, in uniting into filaments, or other forms, constitute the fibrine, which, as respects its constitution, is probably only a modified or more highly animalised albumen, which abounds more or less in the serum. When the coagulum of the blood is exposed to a stream of water, the colouring matter, detached from the central corpuscles, is washed away, whilst the corpuscles themselves remain aggregated in the form of fibrinous filaments. It is the various forms assumed by the aggregation or mutual attraction of the central corpuscles, in relation to the separation, deposition, or entanglement of the colouring matter, and to the appearances of the serum in which these changes take place, which constitute the phenomena of coagulation, and give rise to the appearances of the blood characteristic of inflammatory action. In addition to these facts, the following *inferences,* as to the causes of the phenomena of coagulation, may be abridged from my notes above referred to: —

27. 1. The globules of the blood possess a rotatory motion during life, this motion continuing until shortly before coagulation takes place. — 2. This motion is the consequence chiefly of the organic nervous or vital influence which is exerted by the ganglionic system on the heart and blood-vessels, and which is partially imparted to the globules. — 3. This influence thus preserves the blood in a state of due fluidity. — 4. The fluidity of the blood is hence a vital phenomenon, or property *derived* from, and depending upon, the vital conditions of the vessels in which, and the organs through which, it circulates; the vital conditions of the vessels and organs depending, as shown elsewhere, chiefly upon the organic nervous influence. — 5. The cause of the *coagulation* of the blood is not to be found in external agencies, but in the loss of the vital influence and motion of the globules, proceeding from the sources just assigned — the power exerted by the ganglionic upon the vascular system. — 6. The presence of air, particularly the oxygenous portion of it, and several physical and chemical agents, hasten coagulation, whilst others delay or altogether prevent it. — 7. When coagulation commences at any point of a mass of blood, it is rapidly propagated throughout the whole: rest favouring coagulation; whilst motion delays or prevents it. — 8. The heat of the body and the strength of the circulation are not causes of the blood's fluidity, but are both results of the same cause, namely, the vital energy of the vessels, and vital endowment of the globules of the blood: both are co-ordinate; and both, as well as the phenomena connected with coagulation, are dependent on this source. — 9. Coagulation occurs sooner in venous than in arterial blood; and coagulation of arterial blood is still longer delayed if it be prevented from leaving the arteries. — 10. Coagulation takes place the sooner after the blood is removed from the vital sphere of the system, the weaker the vital energy to which it was subjected whilst circulating in the system. — 11. The weaker the vital energy, and consequently, the quicker the coagulation, the more lax is the coagulum which is formed. — 12. Coagulation is more slow, and the coagulum more firm, the more energetic the vital action of the vessels. — 13. As the central corpuscles lose their coloured envelopes soon after their removal beyond the sphere of the vital influence of the vessels, and as this is the first part of the act of coagulation following the loss of motion of the globules, so it may be inferred, that the colouring matter continues to surround the central corpuscles in consequence of the vitality emanating from the interior of the vessels and endowing the globules; and that the separation of the colouring envelope from the central corpuscle is the result of the loss of a portion or of the whole of that vitality, and of the rotatory (1.) motion which it occasions; and, as the loss of vitality may be reasonably supposed to be quickest where it has existed in the lowest grade, the separation of the coloured envelopes, and the attraction of the central corpuscles forming the fibrine, will be the quicker, the weaker the vital energy, and *vice versâ;* but the coagulum will be the more lax or imperfect, as shown by the facts already stated (10, 11.). — 14. Although the loss of the rotatory motion and of the colouring envelopes of the globules disposes the central corpuscles to attract each other, yet the attraction is weak in proportion to the depression of organic nervous or vital power endowing the vascular system at the time when the blood is abstracted; and in some inflamma-

tions, as well as in some other diseases, the depression may be so extreme as to deprive the central corpuscles of all power of uniting in the form of fibrinous filaments. In such cases, these corpuscles merely mix with the serum like a gelatinous or albuminous matter, and either suspend the colouring substance, or allow its deposition to the bottom of the vessel; the central corpuscles separating imperfectly from the serum or combining with its albumen, or forming merely an almost colourless gelatinous mass in the upper parts of the coagulum. — 15. The firmness of the coagulum is in proportion to the degree of organic nervous influence endowing the vascular system, and to the emanation which the globules themselves derive from this influence.

28. From what is now advanced, the appearances of the blood in inflammatory and other diseases will be readily explained. When the organic nervous power is depressed or exhausted — as in asthenic inflammations, in typhoid and adynamic fevers, in the true infectious puerperal fever, and puerperal mania, in the worst forms of erysipelas and diffusive inflammation of the cellular structures, and in several other diseases, particularly when epidemic, or occurring in hospitals, the air of which is vitiated by crowding of the sick, and the decomposition of the discharges and secretions, as in lying-in hospitals — the blood taken from a vein will often not separate into a distinct coagulum and serous fluid, but will assume the appearance either of a black, grumous, sanious, semi-gelatinous mass, or of a straw-coloured jelly, at the bottom of which jelly the colouring matter forms a loose reddish brown, or blackish, stratum. In such cases, the blood, participating in the deficiency of the vital energy of the body, and being also, perhaps, deranged from the admixture of hurtful materials with it, which are not duly eliminated by the various emunctories, evinces the lowest grades of vital endowment — the attraction between the central corpuscles of the globules being too weak to form a coagulum and to exclude the serum, the colouring envelopes separating speedily from the central corpuscles, and forming a loose stratum at the bottom of the vessel.

29. It may be inferred, as corollaries from the foregoing, that the appearances which the blood exhibits have always an intimate relation to the vital conditions of the system, and to the excitement of the heart and blood-vessels; that the buffy coat is merely one of the manifestations furnished by the blood, indicating reaction of the powers of life, or excitement of the vascular system; that the blood participates in the vitality of the body, through the medium of the vessels and organs in which it circulates; and that, according to the degree or condition of this vital endowment, coagulation and the coagulum are modified in their phenomena and appearances, and the production of the buffy coat promoted or altogether prevented. (See art. BLOOD, § 81. *et seq.*)

30. ii. OF CHRONIC INFLAMMATION. — Inflammation may affect any tissue or organ in so mild and obscure a form from the commencement, as to proceed for a long and indeterminate period; and, in many cases, to escape detection for a long time, owing to the slightness and gradual progress of the phenomena constituting the inflammatory act. This may be termed *Primary Chronic Inflammation.* The chronic form of inflammatory action is, however, frequently observed to follow the acute disease; the latter, owing to diathesis, treatment, premature exposure, and to the operation of injurious agents before recovery had taken place, only partially disappearing, or degenerating into a milder and more prolonged state of action. This state may be called *Consecutive Chronic Inflammation.*

31. *A.* The *Local Symptoms* vary remarkably with the mildness or severity of the morbid action; for, as the term *chronic*, as well as *acute*, is merely conventional or relative, both marking extremes of action, between which every intermediate grade is to be found, each of the phenomena already described, as characterising sthenic inflammatory action, appears in different states of development in different cases and circumstances. Generally speaking, however, all the local symptoms are much less severe than in the acute disease, and sometimes so slight as to escape detection. — *Pain* is occasionally absent, or is so slight as not to excite attention. — *Redness* is also sometimes slight, or not very remarkable. — The *temperature* is not much elevated: it is often not above the natural standard. — *Swelling* is frequently slight, but it is sometimes very considerable; and throbbing is seldom complained of. — The *functions* of the organ, or part affected, are generally more or less disordered; but in some instances the disorder is slight, or even escapes detection. This is especially the case when a portion only of an organ or part is chronically inflamed. When an internal organ is thus affected, it is chiefly by the presence of disordered function, and by the constitutional or sympathetic effects of the morbid action, that the nature and seat of the disease can be detected.

32. *B.* The *Constitutional Symptoms* are often slight and obscure, — sometimes prominent and characteristic. — *Febrile symptoms* are not always present; and even when most manifest, they are rarely of a continued type. They are generally remittent, or almost intermittent; the exacerbations being preceded by languor, uneasiness, or slight chills, followed by increased frequency of the pulse, by thirst, dryness of the mouth, and heat of skin. These symptoms come on in the evening, impair the rest, and subside in the morning, either with or without perspiration. The general health is more and more impaired, the strength fails, the flesh wastes, and the complexion waxes pale, sallow, or unhealthy. If the generative or urinary organs are the seat of the disease, various nervous or sympathetic symptoms are present; and if matter forms, or ulceration takes place, the chills become more severe, the febrile exacerbations terminate in copious perspirations; the urine is thick after standing, or deposits a sediment; emaciation proceeds more rapidly, and hectic fever is established.

33. iii. PROGRESS AND DURATION.—The progress and duration of sthenic inflammation are influenced by the constitution or diathesis, habits of life, age, and sex, of the patient; by the structure or organ affected; and by the treatment and influences to which the disease is subjected. The sanguine and irritable temperaments, a full and robust habit of body, and youth or the vigour of age, not only impart a sthenic character to inflammation, but also cause it to assume an acute or active form, or to run its course rapidly. A

similar effect is favoured by parts which are naturally vascular, and supplied abundantly with nerves, or endowed with high sensibility, and especially if they be placed near the centre of the circulation. On the other hand, the melancholic leucophlegmatic, and nervous temperaments, the scrofulous diathesis, an advanced period of life, and the female sex, prolong the progress of inflammatory action, and cause it to assume, either primarily or consecutively, a latent, languid, or mild and chronic, form. Structures endowed with little vascularity, and with a low grade of sensibility, as tendons, ligaments, fasciæ, and bones; also parts far removed from the centre of vitality and of circulation, as the extremities, are most prone to inflammation of a slow and chronic character.

34. The patient's habits of life have a remarkable influence in determining the character of inflammation from the commencement, — in favouring the passage of the acute into chronic disease, and in disposing the latter to assume the former state. Full living, and the use of much animal food, or of exciting and intoxicating liquors, have these effects especially, and not only prolong or aggravate the morbid action, but also cause its unfavourable termination. Similar results are also produced by injudicious treatment; by exposure to a close, miasmatous, foul, or unhealthy atmosphere; by certain epidemic constitutions of the air, depending upon electrical conditions, or other circumstances; by mental anxieties and perturbations, and improper or premature exercise or excitement of the functions of the part affected. These not only prolong or aggravate acute inflammation, but also render its terminations more unfavourable than they otherwise would have been; and cause slight or chronic inflammatory action to pass into the acute and active state.

35. The circumstances just alluded to render the *duration* of sthenic inflammations quite indeterminate. The active and acute states may continue but a short period, — but two or three days, or even not so long, until one or other of the terminations about to be described takes place; and the slight or chronic state may endure months, or even years. Between these extremes, every intermediate term of duration, as well as grade of action, may be seen. The duration depends chiefly upon the organ affected; acute inflammation in vital parts, especially the stomach and bowels, terminating most rapidly.

36. iv. The Complications of sthenic inflammations deserve some notice, although hitherto the subject has received no attention from pathological and practical writers, owing manifestly to the "*verba magistri*," the dictum of Hunter, — that two diseases cannot co-exist in the same frame. This, however, does not apply to inflammations, and hardly to other diseases, not excepting even specific contagions. The one morbid action may mask or absorb the other; but the one that predominates has its principal features somewhat modified by the association. In cases of chronic inflammation, particularly in females, and in young or nervous subjects, the sympathetic disturbance produced by it, will often attract the chief attention of the patient, and also of the physician; and a disease, truly depending upon inflammatory action, in some one of its grades, may be viewed as nervous, spasmodic, or functional. This most frequently applies to inflammations of the uterine and urinary organs, of the cerebro-spinal masses, and of the digestive mucous surface; and is fully illustrated in the articles Hysteria, Hypochondriasis, &c.

37. When a vital organ is inflamed, either acutely or chronically, other parts sympathise more or less; and when the inflammatory action is slight, the affected organ may not manifest the disorder by characteristic phenomena, the sympathising parts actually presenting the chief disturbance. Parts, also, which were at first only sympathetically affected in their functions or sensibility, may either, from the severity, or from the continuance, of such affection, become more and more seriously diseased, until the structure is changed; and thus, what was merely a symptom, increases to a morbid association; and, lastly, to a true complication; or even, ultimately, becomes the principal disease, the primary inflammation subsiding, or entirely disappearing, as the consecutive complication is developed. Instances of this are not infrequent in respect of inflammations of the lungs, pleura, pericardium, and heart; the disease originating in either, and extending to the others; the primary affection being masked by the consecutive disorder, and sometimes ultimately absorbed by it. Such occurrences still more frequently take place when any one of the abdominal viscera is inflamed; two or more of them becoming consecutively affected, the disease either continuing for a time to co-exist in them, or disappearing from the one as it is developed in the others.

38. The complication of inflammations with each other, or with nervous, spasmodic, or convulsive disorders, or even with hæmorrhage, is much more common than is usually supposed, — the latter often depending upon the former, particularly when the inflammation is chronic, slight, or latent. In such cases, the passage of the disease into a more acute or active form becomes an advantage, by disclosing its nature. Such complications are frequent in childhood, and in females, particularly during the puerperal states. Many of the convulsive affections of the former derive their origin, in a large proportion of cases, from inflammatory action; and most of the nervous, spasmodic, painful, and hysterical disorders of the latter, arise from inflammatory action of a slight and chronic form in the uterus, ovaria, or urinary organs.

39. v. Terminations and Consequences.—Inflammation, correctly speaking, terminates only in *two* ways: in *resolution*, or the recovery of the healthy state of action; and in *gangrene*, or the death of the inflamed part. The other morbid conditions, improperly ranked as terminations, are merely *consequences* of inflammation, the morbid vascular action giving rise to them, still subsisting in most instances, in some one or other of its forms. — *A.* When inflammatory action terminates in *resolution*, the phenomena subside very nearly in the order in which they appeared. Pain ceases; the redness and heat diminish; the swelling subsides gradually, and the functions slowly return. In many cases, however, the swelling continues with little diminution for a considerable time, and the functions of the part are restored with equal slowness; the recovery of the impaired tone of the capillary vessels, and the absorption of the sero-albuminous fluid effused in the areolæ of the tissues, being

necessary to the subsidence of the swelling, and to the restoration of function. This termination may be looked for when the inflammation does not proceed too rapidly; when the pains are neither acute, lancinating, nor throbbing; when the symptomatic fever gives rise to a general and copious perspiration; and when the urine deposits a sediment.—*B.* The termination of inflammation in *gangrene*, is so fully discussed in that article, that nothing further need be advanced respecting it at this place. (See art. GANGRENE, § 3. *et seq.*)

40. *C.* Of the *consequences* or *results* of inflammation, the most important are —*exudation, softening, suppuration, ulceration, induration, thickening*, and, probably, other organic changes. Several of these are treated of in separate articles; a simple reference to which, at this place, will be sufficient. — *a. Exudation* or *effusion* is the earliest and most common consequence of inflammatory action; the swelling, constituting one of the chief characters of inflammation, being caused by it chiefly. Exudation is the deposition, in the areolar tissue, in the parenchyma of an organ, in a cavity, or upon some surface, in consequence of excited vascular action, of a fluid consisting chiefly of the natural secretion of the part, greatly increased in quantity, and remarkably altered in its properties and appearances. This exudation sometimes commences at a comparatively early stage; but most commonly it becomes abundant at an advanced period, or even towards the close, of the morbid action; and it occasionally favours a resolution of this action, but not infrequently some degree of inflammation still subsists with it. The fluid which is exuded or effused, varies in its characters with the structure affected, and with the degree or activity of the morbid action producing it. Something also depends upon the function of absorption in the part; for when it is active, and the more fluid parts of the exudation are thus removed, the state of the remaining parts will be thereby much modified. Hence the fluid is serous, sero-albuminous, flocculent, turbid, liquid, thick or partially consistent, ropy or glairy, coagulated, adherent, albuminous, or even membranous or fibrinous.— The fluid exuded in inflamed cellular or parenchymatous structures is generally serous, turbid, sero-albuminous, or flocculent, but becoming more consistent, albuminous, or otherwise changed, as absorption proceeds. That which is exuded from inflamed serous surfaces is either fluid and transparent, or turbid and flocculent, or thick, semi-coagulated, and albuminous; films or layers of lymph, or of albuminous matter, covering the affected surface, or agglutinating opposite parts. The fluid exuded from mucous surfaces varies in different situations, and as the follicles, or the mucous membrane itself is principally affected. Hence the morbid secretion is watery or thin; or mucous, thick, and opaque; or glairy, ropy, gelatinous, and transparent; or muco-puriform, or sanguineous; or muco-albuminous, or consisting chiefly of an albuminous lymph.

41. The intensity or activity of inflammatory action influences, not only the quantity, but also the nature, of the effused fluid. When this action is weak or slight, the fluid is chiefly serous; and in proportion as it is more active or severe, the effusion is more albuminous, and presents the characters of coagulable lymph. But the effused fluid is also much modified by the constitution, diathesis, and habit of body of the patient, and by the vital and physical influences to which it is exposed for a time after its effusion. When the fluid is retained for some time in contact with surfaces which exuded it, the more watery portion is absorbed, and the albuminous part, or the lymph, becomes more plastic and solid, and, ultimately, even organised. This is shown especially in chronic and sub-acute inflammations of serous membranes. Even in mucous surfaces, as in the fauces, larynx, and trachea, the albuminous fluid exuded during inflammation is changed, not only by a partial absorption, but also by the evaporation, during the constant passage of the air over the parts during respiration. The scrofulous, the gouty, and the rheumatic diatheses further affect the quality of the fluids effused from inflamed surfaces; but still more depends upon the intensity of the general vascular disturbance, in connection with the state of vital power. When the former is energetic, and the latter unimpaired, then the effused fluid is albuminous, and abounds in coagulable lymph, a *formative*, as well as a *reparative*, process, frequently resulting therefrom; a formative process often appearing from inflammation of serous membranes, and a reparative process after the division or wounds of parts. When the febrile and vascular disturbance is great, and organic nervous or vital power is much impaired, the fluid effused is watery, sanious, turbid, septic, offensive, &c.; the morbid action being incapable of effusing a fluid sufficiently coagulable to be the medium of adhesion between opposing surfaces, or to limit the spread of the morbid action to surrounding parts. Hence inflammation, in these circumstances, assumes the asthenic, spreading, and disorganising characters about to be considered. One of the chief and most important features of sthenic inflammation is its disposition to exude a fluid more or less coagulable, by which parts adhere and unite, and which even becomes organised, and arrests the extension of the inflammation, as well as limits the destruction or disorganisation of the parts in which it commenced.

42. Albuminous or coagulable matter exists in the fluids effused or exuded by sthenic inflammation in various proportions. In the more liquid effusion, it is in small quantity, and is separated from the serum which suspends it, or holds it in solution, by heat and by the mineral acids; but of the more solid or consistent exudation, it constitutes the principal part. Between these extremes it is found in every proportion. In puriform matter and pure pus, albumen exists in the form of minute corpuscles, or globulus, swimming in a turbid serous fluid. In this, as well as in the more fluid states in which albumen presents itself, it is incapable of organisation; but, in the more solid or plastic state, it often becomes organised, and is the bond of union between divided parts, when the powers of the constitution, and the condition of the circulating fluids, admit of its production. Salutary or reparative effects, from the effusion of coagulable lymph, are evinced also by its effusion around *abscesses*, by its agglutinating serous membranes, when morbid formations, ulceration, and purulent matter are about to perforate them; and by its obliterating arteries or veins, after ligatures, or in circumstances where dangerous hæmorrhage

would otherwise occur. (See ABSCESS, and ADHESIONS.)

43. *b. Softening* is a very general consequence of inflammation, and one of the earliest which attends it. Indeed, inflammatory action seldom continues long, particularly in an acute form, without impairing more or less the vital cohesion of the tissues affected. It often precedes suppuration, and it generally increases the disposition to effusion. It is most remarkable in mucous and cellular parts, and in parenchymatous organs, particularly the brain, lungs, liver, &c.— these becoming more friable as well as softer, than natural. But softening from this, as well as from other morbid conditions, is fully considered in the *article* devoted to the subject.

44. *c. Suppuration* is the natural result of inflammation, when it is allowed to attain a high degree of intensity, especially in cellular, parenchymatous, and mucous structures. — *Pus*, the product of the suppurative act, is apparently produced from the albuminous part of the blood, by an altered state of the vital condition of the capillaries. It is very difficult to show satisfactorily in what this alteration consists; but it probably is impaired tone, or deficient vital contractility, of the capillary vessels, the arterial branches supplying them being still more or less excited. Suppuration may be viewed as a true act of secretion; although pus, as it usually appears, is somewhat changed in the course of its production by absorption, by the vitality of the parts with which it remains in contact, by temperature, and by evaporation. The small whitish flocculent masses often found in the purulent matter, consist chiefly of a more concrete albumen secreted by the inflamed part. Although suppuration chiefly takes place in the structures mentioned above, yet it sometimes is seen in other parts, especially in the cavities of joints, and more rarely in serous surfaces. In these situations, particularly in serous membranes, it is generally a result of intense action in connection with deficient power.

45. Mr. HUNTER was the first who recognised with any degree of accuracy the changes which take place in the blood, and in the capillaries of an inflamed part, during suppuration, inasmuch as he considered that pus was a remove further from the nature of the blood, than the matter formed by adhesive inflammation, — than coagulable lymph; and M. GENDRIN is of the same opinion. The formation of pus in an inflamed surface or tissue takes place as follows, according to the observations of KALTENBRUNNER, GENDRIN, CARSWELL, and the author.—In the field of a microscope, the inflamed capillaries seem uniformly red, and the circulation in them is retarded or has ceased. Serum and coagulable lymph are effused in the areolæ of the tissue; and, if the inflammation is very intense, the exuded fluid is more or less coloured by the exudation of red globules or of blood. The whole of the inflamed part is quite opaque. As soon as suppuration commences, the red colour begins to disappear in various points, giving place to a yellowish granular-like matter in the capillaries, and connecting cellular tissue. In the centre of the inflamed tissue, several of the capillary vessels, which were obscured by the accumulated blood, re-appear, — some containing red, others yellowish grey, globules, which gradually become more distinct, increase in number and size, begin to move slowly, and, traversing the capillaries, arrive at the surface of the tissue, or at the edges of the solution of continuity, if this has occurred, in the form of globules of pus (CARSWELL.). GENDRIN states, that he has distinctly seen the globules of blood, after stagnating in the capillaries of the inflamed part, losing their colouring envelopes, becoming opaque, and assuming a greyish yellow colour, approaching to that of pus; and that he has traced them moving slowly in the capillaries, and, as they advanced to the suppurating surface, gradually acquiring all the characters of pus. The observations of KALTENBRUNNER agree with those of GENDRIN, as to the transformation of the blood-globules into the globules of pus, and as to this taking place *within* the capillaries; but they also seem to prove, what I have observed in several instances, that the red globules, or blood, exuded in an intense state of inflammation into the areolæ of the tissue, undergo a similar change to that which takes place within the capillaries, when the circulation becomes stagnant in them; and that pus may thus be formed *without*, as well as *within*, the capillaries of an inflamed part, the fluid portion of the secretion consisting of the serum of the blood. KALTENBRUNNER even supposes, that not only the blood of the inflamed tissue, but likewise a part of the tissue itself, is converted into pus-globules. But, I belive that this takes place only where suppuration is followed by *ulceration* (§ 48.), or where an ulcerated surface secretes a puriform fluid.

46. From these facts it is evident, that, in an inflamed part, certain changes precede the formation of pus: — 1st. A loss of the vital tone, or a change of vital action in the extreme capillaries; — 2d. A retardation or stagnation of the circulation, and partial coagulation of the blood in them; — 3d. A change of the blood-globules into pus-globules, and the discharge of the latter with a portion of serum on the suppurating surface; — 4th. A similar change of the globules of blood extravasated in the inflamed part, — these globules losing their colouring envelopes and becoming the globules of pus. As connected with the subject of suppuration, some notice might be taken of the presence of pus in the general circulation, or in situations remote from the seat of inflammation; but as this belongs rather to the translation and metastasis of inflammation—to consecutive inflammation, it will be considered hereafter.

47. *Pus*, or purulent matter, — the product of suppuration, — is a slightly unctuous fluid, of the consistence of thin cream, which it otherwise resembles. It is generally of a whitish or pale yellowish colour, and of a mawkish or sweetish taste. It is nearly inodorous when cold, but when heated, it emits a faint, sickly, and unpleasant odour. Under the microscope, it presents corpuscles or particles swimming in a serous fluid. These corpuscles resemble the central corpuscles of the globules of the blood, deprived of their colouring envelopes, and consist of a highly animalised albumen. The serous part of the secretion differs but little from the serum of the blood. In many situations, pus is mixed with the more natural secretions of the part; the latter being either altered in their characters, or increased in quantity. This is especially the case in acute inflammations of mucous surfaces; the fluid excreted consisting of pus and mucus in variable proportions. The

other relations of suppuration are fully considered in the article Abscess.

48. *d. Ulceration* is distinguished from suppuration chiefly in its being attended by a loss of substance — by a destruction of parts; and by a more or less abundant secretion of a puriform, ichorous, fœtid, sanious, and variously coloured fluid. It may immediately result from inflammation, or be consequent upon suppuration, or the formation of an abscess. It depends chiefly upon causes connected with the treatment of the part in the earlier stages of inflammation; upon the diathesis, habit of body, or existing constitutional vice, as scrofula, scurvy, syphilis; and upon the state of the digestive and excreting functions. Ulceration is always preceded by softening — by a loss of the vital cohesion of the tissue inflamed, at the surface or part most remote from the centre of circulation, or at the termination of the capillary vessels. Along with the softening there is also a more or less copious effusion or exudation of a serous fluid, in which the organic molecules, which have lost their vital cohesion, are liquefied or suspended. Hence the discharge is ichorous, offensive, sanious, or coloured. In the more rapid or phagedenic states of ulceration, and when the discharge is scanty, and in parts covering abscesses, very probably the organic molecules are absorbed nearly as fast as they lose that degree of vital attraction, necessary to their cohesion in the diseased surface. From this, the relation of ulceration to sphacelation and gangrene, particularly hospital gangrene, is apparent. (See art. Gangrene.)

49. When an ulcerated part begins to return to a healthy state of action, the diseased secretion becomes more puriform or albuminous; and an attempt is made to restore the loss of structure by a process called *granulation.* The vessels of the ulcerated surface acquire a more sthenic action; the disposition in the tissues to lose their vital attraction or cohesion is arrested; and the secretion assumes at first a puriform, and afterwards an albumino-puriform, character; the albuminous or co-coagulable portion of the secretion coating the inflamed surface, protecting it, and ultimately becoming organised or partially identified with it. These changes in the ulcerated surface are evidently brought about by an improvement in the organic nervous influence of the part; and hence the success of a treatment, general and local, calculated to restore or to promote the energy of this influence, especially through the medium of the digestive and respiratory organs.

50. *e. Induration,* and *thickening* or *hypertrophy,* of structures, consequent upon inflammation, are discussed in the articles on these lesions. It is unnecessary to offer any further remark respecting them, than that they are generally consequences of chronic inflammation, and of acute or sub-acute inflammations which have passed into the chronic state. They may also be referred to the exudation, into the areolar tissue, of a sero-albuminous fluid, the more serous parts having been absorbed, and the albuminous parts organised, or assimilated to the structure including them. From this source other organic lesions may arise, according as the exuded matters undergo a more or less complete organisation, or according as they are retained in the state of merely minute amorphous masses disseminated in the areolæ of the structures, and are preserved from dissolution or change by the vitality of the surrounding parts. (See arts. Induration, and Hypertrophy; also Disease.)

51. II. Varieties or Modifications.—Having described inflammation, as occurring in a previously healthy constitution, or in its *sthenic form;* and having viewed this as the more usual and standard condition of the disease, whether appearing in the *acute, chronic,* or *intermediate* states; it becomes necessary to consider the *alterations or deflections from sthenic inflammatory action,* occasioned by the previous health, or the existing constitution, of the patient, and by the nature of the predisposing, the exciting, and the concurrent causes. Many of the lesions of vascular action arising from these sources are so different from the true sthenic condition now discussed, as to admit of doubts as to the propriety of viewing them as inflammations; yet they have intimate relations to the sthenic disease, inasmuch as they possess nearly the same local characters as it, and often in a very remarkable degree, — as they differ from it merely in kind, and often by slight shades only, — as they may be converted into it by a general and local restorative treatment, — and as the sthenic disease may be reduced to some one of these lesions by various depressing influences, or contaminating agents.

52. In the view just taken of sthenic inflammation, we have seen merely different *grades* of action; the disease being *acute,* or *chronic,* or some intermediate state usually called *sub-acute,* according to the degree of *severity* or of *activity* presented by the morbid action, relatively to the constitution and powers of the patient. Whilst the term *active* has been applied by many to the more acute states of sthenic inflammation, the word *passive* has been used as synonymous with the chronic conditions. To the former of these appellations, and to its application, little objection need be urged; but the latter is by no means applicable to any state of inflammation — neither to the chronic states of sthenic inflammation, nor to the *asthenic varieties* about to be considered.

53. With the increased local and general vascular action, constituting the states of inflammation above described, the constitutional powers are not much reduced or otherwise altered, nor are the depurating functions impaired, nor is the blood materially vitiated or deteriorated, in the early stages at least, or until the disease approaches an unfavourable termination. But in the varieties about to be noticed, the powers of life are much depressed or otherwise deranged from the commencement, the depurating or excreting functions are interrupted, the blood more or less altered, and the nervous sensibilities increased. Hence, vital resistance to the changes consequent upon increased susceptibility and diseased vascular action is greatly impaired, and disorganisation rapidly supervenes, and as speedily proceeds, unless arrested by the most efficient means. To these circumstances, however produced, are to be imputed those alterations, or deflections, from the sthenic or true form of inflammation, that frequently present themselves in practice, with characters varying with the cause and seat of the disease, and with the peculiarities of the patient. As the inflammations already described present no obvious loss of power in their earlier stages, or until their terminations, and are therefore justly termed *sthenic;* so those about to be considered

may be generally denominated *asthenic*, from the want of organic nervous energy, and the loss of vital resistance to the progress of disorganisation, which they usually present, unless controlled by judicious treatment. They have also been denominated *typhoid, venous, erythematic* and *erysipelatous;* but these are chiefly specific terms, the generic appellations, *spreading, diffusive, disorganising*, or *asthenic*, being more appropriate.

54. i. OF ASTHENIC INFLAMMATIONS.—*A. Of the Local Alterations, or Characters.*—*a. Uneasy sensation*, or *pain*, is the earliest, and sometimes the most remarkable, symptom, particularly when serous membranes or circulating vessels are affected. When the disease is caused by external injury, by the inoculation of morbid matters, as in punctures during dissection, the pain is often early and acutely felt, even in cellular parts, although no other change has yet appeared. In nervous, susceptible, and weakened persons, the pain is so acute as to accelerate or increase the restlessness or delirium consequent upon the constitutional symptoms, which are often remarkably severe, compared with the apparent small extent of the local disease, especially when caused by an animal poison. Pain, however, is frequently not very severe in certain forms of asthenic inflammation, particularly when parenchymatous organs are their seat, and when they are consequent upon some disease, which has lowered or exhausted organic nervous power and sensibility. The inflammations which complicate or appear in the course of continued fevers, are illustrations of this; and the metastasis of erysipelas, or the transference of inflammation from an external part to an internal organ, seldom gives rise to much pain. The amount of uneasy sensation depends chiefly upon the tissue implicated, upon the exciting cause, upon the constitutional susceptibility of the patient, and upon the state of the blood. In cellular, mucous, and yielding structures, it is sometimes slight, particularly if the purity of the blood is impaired by imperfect excretion, unless the inflamed and turgid parts be partially strangulated by aponeurotic expansions or other unyielding textures, as in diffusive inflammation of the *cellular tissue*, and in various states of *erysipelas*. In this latter, and in inflammation of the lymphatics, the pain is generally tensive, burning, or stinging, and occasionally remittent. There are always great tenderness, and sensibility to the touch, unless the affected parts are deeply seated.

55. *b. Redness* and *vascular injection* are always very remarkable. The former often either rapidly passes into a deep, dark, brownish-red, livid, or purplish hue; or presents more or less of either of these from the commencement. It is sometimes of a pale or yellowish red tint. The vessels are injected and distended, and the current of circulation through them is slow, or impeded. The already dark hue of the blood is further deepened by this congestion; and the exudation of the serous portion of it is facilitated by the weakened state of the vital cohesion of the tissues, by the impaired tone of the capillaries, by the increased frequency of the heart's contractions, and by the diminished crasis of the blood itself. The discolouration and injection of the part in the various asthenic states of inflammation are generally indices of the extent to which the vital tone of the vessels and tissues is exhausted, and the blood, especially that circulating in the part, is altered.

56. *c. Increased temperature* is present chiefly at the commencement of asthenic inflammation, and when membranous tissues and circulating vessels are attacked. Even in these cases, at an early period, the actual rise of temperature in the affected part is often not greater than on the surface of the body generally. Where the febrile disturbance is great, the pulse very quick, and the skin dry, the heat of the general surface and of the diseased part is very considerable; but it is also peculiar, as observed in typhoid and malignant fevers; it seems to be greater than it really is, and is attended by a stinging, harsh, and unpleasant sensation. As effusion into the areolar tissue of the part proceeds, and as the swelling extends, little or no increase of heat is usually observed; and sometimes the temperature of the part may even be lower than that of the surface of the trunk, or even lower than natural.

57. *d. Swelling* is considerable, and sometimes very great, when cellular or parenchymatous tissues are affected. It is caused at first by the relaxation of the vital tone of the capillaries and tissues, and by the injection of the former; but consecutively, and chiefly, by the effusion of serum from the diseased vessels. The swelling is always diffused, is disposed to extend itself, and is never acuminated or convex. It is generally soft, sometimes boggy or œdematous, and never elastic or hard, unless from the tension occasioned by aponeurotic or unyielding structures stretched over the swollen part. In mucous and serous membranes, it is much less manifest, although existing more or less; and, in them, it is owing chiefly to the distension of the capillary vessels, and to the relaxation of the tissues themselves.

58. *e.* The *secretions* and *functions* are always disordered by asthenic inflammation: — the former are altered and generally increased in quantity; the latter are remarkably impaired. When a secreting membrane or surface is attacked by it, the discharge is variously changed from the healthy state, the change obviously arising from the impaired state of vital power, the morbid condition of the blood, and the acceleration of the circulation. The effusion generally consists of a foul, dark, turbid, ichorous, septic, sometimes whey-like, fluid. In puerperal females, it is often remarkably abundant, and contains much curd-like or semi-coagulated matter, partially separated from a turbid or whey-like serum. This watery, serous, or ichorous fluid, is also abundantly effused in the areola of the asthenically inflamed cellular tissue (see *Diffusive Inflammation of* CELLULAR TISSUE); and, owing to the deficiency or absence of coagulable lymph or albumen, it readily spreads to, and infects, or contaminates, the surrounding tissues. This is one of the chief characters of asthenic inflammation; its *spreading* or *diffusive nature*, especially, resulting from the states of general or local vital power, and of vascular action, which are insufficient for the formation of coagulable lymph, by which the local disease may be limited.

59. The secretions from glandular organs are also remarkably altered in quality as well as in quantity; but their quantity is as often diminished as increased. Sometimes they are nearly or altogether suppressed, particularly in extreme cases

of the disease, manifestly owing to the loss of organic nervous influence or vital power, in connection with the distention of the capillaries. When the substance of the liver is the seat of asthenic or diffusive inflammation, bile is either not secreted, or is absorbed as soon as it is secreted, giving rise to one or other of the forms of JAUNDICE (§ 28.) described in that article as consequent thereon. The swelling, also, caused by the distention of the diseased vessels, and by the effusion into the parenchyma of the organ, is so great as to press upon the ramifications of the ducts, and to prevent the passage of the fluid along them as it is secreted. This is especially the case, when the secreting organ is inclosed in an envelope or membrane, which does not readily yield to the distension thus occasioned.

60. *B. The Constitutional Symptoms.* — Asthenic inflammations derive their peculiar characters, local as well as general, from either pre-existing disorder, or the poisonous nature of the exciting cause. The former consists chiefly of *debility*, as manifested in the assimulating, circulating, and excreting functions (see DEBILITY, § 12. *et seq.*). The vital powers are impaired throughout the frame, and especially in the organs of digestion, circulation, and depuration. Hence, with increased sensibility and susceptibility of the nervous system, the blood soon becomes affected, and is less suited for the production of a healthy secretion, and for the formation of coagulable lymph or albumen in the seat of inflammation, than in persons otherwise circumstanced. When asthenic inflammation depends upon the exciting causes, it will generally be found that they possess poisonous or contaminating properties which infect the frame, whilst they produce inflammatory action in certain structures by their specific operation, as in the infection of erysipelas; or which contaminate the system by acting directly upon the part with which they come in contact, as when a septic animal fluid, or an animal poison, is applied to a wounded or abraded surface. Very frequently asthenic inflammations derive their constitutional, as well as their local, peculiarities from both these sources, — from the previous state of health as well as from the nature of the exciting cause. In surgical practice, they not infrequently depend upon the severity of the shock sustained by the system, in cases of very severe local injury, as in extensive bruises and crushing wounds, or after operations. In all cases of asthenic inflammation, although the states of constitutional or vital power, and of the circulating fluid, are chiefly concerned in modifying the character of the local disease, yet the local, generally reacts upon the general affection, the one aggravating the other reciprocally and progressively, until either a fatal disorganisation, or arrest of function takes place, or a favourable change is brought about by energetic means. This is evinced especially in the diffusive visceral inflammations occurring in diseased or cachectic habits of body, or in the course of continued fevers, and in certain forms of erysipelas, and of inflammation of the cellular tissue.

61. The severity of the constitutional symptoms frequently has but little apparent relation to the extent of the local inflammation; the latter being comparatively slight, and presenting but little of the spreading, diffusive, or disorganising characters usually observed in connection with remarkable febrile commotion and vital depression. A person may experience a slight abrasion or puncture of the integuments, followed by inflammation to no great extent, with a more or loss foul discharge, or with a discharge not materially different from that following sthenic inflammation; and yet the constitutional affection may be of the most violent description, and characterised by excessive vascular action, by great excitement and morbid sensibility of the nervous system, and by remarkable depression of nervous power and of vital resistance. It is this state of disease especially which Mr. TRAVERS has so well described under the terms *Direct and Reflected Constitutional Irritation* — terms which, in the present state of our knowledge, convey as satisfactory an idea of the nature of these causes, as any other that can be employed. The remarkable constitutional disturbance characterising them, has been ascribed to sympathy; and probably it may be produced in some instances by the absorption of a morbid or poisonous secretion or fluid into the circulation. But the majority, and these the most severe and the most marked, as to all the peculiarities of these maladies, can be ascribed only to a morbid impression or lesion of the organic nervous system, that is soon propagated throughout the frame, implicating not only the vascular system, but also the cerebro-spinal functions, and all the vital manifestations. So intense a disease, produced by so slight a cause, and depending, apparently, upon so small a local lesion, is, it is true, very inadequately explained by the terms *irritative fever* and *constitutional irritation*, and far less by that of *constitutional sympathy*; but the difficulty is, to denominate them by any other name which shall be in every respect appropriate.

62. The constitutional symptoms attending upon asthenic, foul, or spreading inflammations, appear variously grouped or characterised; but they may be referred chiefly to the following types or varieties: — 1st. General and remarkable depression of organic nervous or vital power, without vascular reaction; — 2d. General depression of vital power, with vascular reaction or excitement; — 3d. Vital depression, with acute nervous sensibility and cerebral disorder; — and, 4th. Vital depression, with remarkable nervous excitement and vascular reaction. — Although the constitutional commotion usually appears in one or other of these forms, yet it must be admitted, that the arrangement is somewhat conventional; that there are often intermediate, or mixed, states of disturbance; and that the general affection may commence in either of these forms, and pass into another, owing to the influences to which the patient is subjected in its course. Nay, fever attending sthenic or adhesive inflammation may be converted into either of these low types of fever, by the more powerful depressing or contaminating influences; and the latter may be changed into the former, by agents of an opposite nature, — similar alterations taking place, from the same causes, in the characters, consequences, and terminations of the local affection.

63. *a. General vital depression, without reaction*, is not of frequent occurrence, and is produced only by a very sedative or poisonous cause, relatively to the power of vital resistance, when depending upon a slight local lesion. It is very

frequently observed after severe shocks, crushing injuries, and operations. However induced, it usually commences with a sense of general coldness, sinking, anxiety at the epigastrium, nausea, occasionally vomiting, and remarkable despondency or depression of spirits. The skin is of the natural or of a diminished temperature; and there is generally little or no thirst. The mental faculties become obscured or stupefied, and the countenance collapsed; and convulsive motions or twitches frequently occur. The pulse is weak, irregular, small, or compressible — sometimes quick or intermittent, but always deficient in power. Vomiting is often attended by little retching, matters being brought up with a species of singultus; and the alvine excretions are always morbid and offensive. As the powers of life sink, low delirium, coma, the supine posture, hiccup, complete physical prostration, sharpened features, and a cold clammy state of the surface, supervene; the local disease either becoming more deeply discoloured, or extending towards the centre of the body, or passing into gangrenous disorganisation.

64. *b. Vital depression, with general vascular excitement and reaction*, is much more common than the preceding variety of constitutional affection. It is generally ushered in by chills or rigors — sometimes with nausea and even vomiting. The skin soon becomes hot, dry, burning, or harsh; but occasionally the affected part is hot and burning, whilst the temperature of the surface is very little elevated. The pulse is generally above 110°, and sometimes it is 120°, or even upwards; it is compressible, open, broad, quick, and irritable — becoming more so, and smaller or weaker, as the disease proceeds. The tongue is foul or loaded, sometimes glossy, and afterwards dry and mahogany coloured. The evacuations are offensive, and otherwise disordered. Medicines, or substances taken into the stomach, are soon thrown off; and there is generally thirst, which is at first urgent, but becomes less so, and is at last not complained of, particularly when delirium takes place. Delirium first appears at night, and either remits in the morning, or continues; and is often followed by coma. In some instances, the vascular excitement is most rapidly developed, or reaction speedily follows the rigors, and all the symptoms soon become severe; violent headach, with anxious collapsed countenance, succeeded by delirium, appearing early. In other cases, the general excitement is more slowly and more moderately produced, and not until several rigors and attempts at reaction have taken place. In either case, exhaustion speedily occurs, and all the symptoms of the advanced stage of the preceding variety supervene. The disease is rapid in its progress, if it be not early arrested by treatment; and the local alteration extends more or less, assumes a more livid or dark hue, or more aggravated form, or becomes more disorganised. When pus has been formed at an early stage of the local affection, and is confined in deep-seated parts, or beneath fasciæ, it is often offensive, discoloured, and different from that discharged after sthenic inflammation. In many instances, the local alteration is apparently slight, in relation to the severity of the constitutional affection; but in others it has extended to a very considerable distance along the absorbents, veins, or cellular tissues, from its primary seat; and has thus either been overlooked, or has infected the blood. (See arts. CELLULAR TISSUE — *Diffusive Inflammation of;* ERYSIPELAS; LYMPHATICS, and VEINS.)

65. *c. Vital depression, with acute nervous sensibility and cerebral disorder*, is very often observed to accompany asthenic inflammations caused by animal poisons and septic animal secretions, especially by the inoculation of either of them during the dissection of dead bodies. In all these, the pain felt in the seat of injury is most excruciating, and is attended by general irritability and impatience; by irregular chills, loss of appetite, intense headach, white tongue, thirst, anxious countenance, nausea, and sometimes vomiting; a frequent, small, quick, or irritable pulse; hot and dry skin; sleeplessness followed by delirium; and, lastly, a dry brown state of the tongue; vomiting, singultus, coma, subsultus tendinum, collapsed features, cold clammy perspirations, and quick, laborious respiration. The febrile commotion often commences insidiously, and without rigors or chills, and proceeds with much rapidity. In this variety, particularly when produced by the causes just stated, morbid sensibility, general irritability, violent headach, and want of sleep, early delirium, and suppressed, imperfect, or weak vascular reaction, are characteristic phenomena; the other symptoms being less constant. The local alterations generally consist of early and remarkably intense pain; excessive and spreading tumefaction; and of purulent formations, first on the seat of injury, but extending successively to parts nearer to the centre of the body, until the trunk and large cavities are reached. The cellular tissue, in the course of veins and absorbents, or around the glands of the latter, is most commonly attacked; and, ultimately, the serous envelopes on internal organs, or even these organs themselves, occasionally become implicated; but other parts, particularly the lymphatics, fasciæ, and veins, are often also affected.

66. *d. Vital depression, excessive irritability, violent pain, and vascular excitement*, often attend cases of asthenic inflammation, arising from similar causes to those inducing either of the former varieties of constitutional commotion; the difference in the degree of vital depression in the one, of nervous disorder in the other, and of vascular excitement in a third, depending chiefly upon the temperament, habit of body, vital power, age, and previous health of the individual, and upon the nature of the exciting cause. In proportion as the cause is of a poisonous, depressing, septic, or contaminating nature, relatively to nervous susceptibility and vascular activity, will the local affection be diffusive, spreading, or disorganising, and the constitutional disturbance be characterised by a predominance of the symptoms marking excessive vital depression, or acute nervous suffering, or tumultuous vascular excitement, devoid of the power of resistance. When the impression of the cause, or the subsequent influence of the local disease, depresses the vital energies beyond recovery, or the power of reaction, the extension of disorganisation, and the sinking of the manifestations of life throughout the œconomy, are remarkably prominent. Where either the cause or the local disease is less overwhelming, relatively to the state of constitutional power, reaction takes

place, and efforts are thereby made to resist the progress of the local and general mischief. Violent pain, and other severe nervous symptoms, whether occasioned by the nature of the exciting cause, or depending upon the state of the system, may attend any of the varieties of constitutional affection — either that of continued depression, or that of vascular reaction. Where the nervous sufferings are extreme, the vascular system usually evinces some degree of excitement, but it is often slight and without power. In certain cases, the reaction is as excessive as that marking the second variety of constitutional affection (§ 63.); is accompanied with the same symptoms, and runs a similar course; the only difference being in the greater affection of the nervous system than in it. In other cases, vascular excitement is not sensibly raised, unless in so far as the great rapidity of the pulse may indicate it, as in the third variety (§ 65.). In either case, the cerebral disturbance is great, and the disease tends rapidly to an unfavourable issue, if not arrested by active means.

67. If *blood* be taken in any of the varieties of asthenic inflammation, it either does not coagulate, assuming a treacly appearance, or it coagulates imperfectly, the crassamentum being loose; or the imperfect coagulum consists, in its upper half, of a mass resembling jelly in colour and consistence, the lower half containing the colouring matter. The blood, however, may present other appearances, particularly those already noticed, and those described in the article Blood (§ 110. *et seq.*). Venæsection, in these states of disease, is generally prejudicial, although, in some of the cases, where the vascular reaction is great, local depletions are often serviceable by unloading the distended capillaries, and diminishing local tension.

68. ii. Progress and Duration. — *A.* The *course* of asthenic inflammations is usually acute; and, unless controlled by salutary agents, is generally to an unfavourable termination. Whilst these inflammations most frequently originate in causes which are septic or poisonous, and depressing relatively to the power of the constitution; they also sometimes follow the more sthenic forms of morbid vascular action, in consequence either of the exhaustion following excessive reaction, or of the operation of sedative influences or contaminating agents. Hence, persons affected with sthenic inflammation, especially of a part exposed to the air, will have it changed to the asthenic form, soon after removal to the crowded wards of an hospital, or to any impure or unhealthy situation; and a similar change will also occur in visceral or internal inflammations, from any depressing influence, moral or physical. On the other hand, *asthenic* inflammations are often converted into the *sthenic*, by restorative means acting upon either the respiratory or the digestive functions. Indeed, the principal indication of cure in the former, is to change them to the latter by such means; but, in order that this end should be accomplished, they must be energetically and appropriately employed. Repeated efforts at restoration, in respect both of the local lesion and the constitutional disturbance, are often made during the course of asthenic inflammation, especially when the treatment is only partially calculated to attain its objects; and the disease thus assumes a remittent appearance, and is much prolonged. When a morbid secretion, or fœtid pus, collects in a part which is deep-seated, although a favourable change may seem to have taken place, from the treatment, all the symptoms, local and constitutional, are sometimes speedily and unexpectedly aggravated, and the patient ultimately sinks. Occasionally, efforts at restoration recur oftener than once, before either recovery takes place, or death ensues. This is especially the case when the disease is caused by the inoculation of an animal secretion or poison; the inflammation extending along the cellular tissue, lymphatics, or veins, sometimes with occasional interruptions to its course, and with short ameliorations of the nervous and general disturbance, until the trunk of the body is reached, when all the symptoms become suddenly aggravated: vomiting, delirium, lurid and collapsed countenance, exhaustion of vascular and nervous power, laboured respiration, clammy perspiration, singultus, &c., appear, and the patient sinks.— Upon *dissection*, collections of fœtid pus, disorganisation of the cellular tissue, and lesions of the lymphatic and circulating vessels, are found extending to the central parts of the frame. The neighbouring cavities also contain effused fluid of various appearances, and the parenchymatous viscera purulent collections; the serous membranes being more or less inflamed, or partially adherent.

69. *B.* The *duration* of asthenic inflammations varies from a day or two to several weeks. It may not be longer than the former period in the puerperal state, and it may be prolonged to the latter in the recurring or remitting form of the disease. It is also often of very short duration, when caused by septic or contaminating animal matters. In many cases, however, when the spreading characters of the local disease, and the adynamic type of the symptomatic fever, have been arrested, a suppurative state of action continues for a considerable time, until more or less complete reparation of the affected part is accomplished. Indeed, this is generally the case when much disorganisation has taken place before the disease is arrested.

70. iii. Complications. — Asthenic inflammations frequently occur in the course of other diseases, particularly of exanthematic, continued, and adynamic fevers. It is chiefly when exanthematic fevers assume an adynamic form, that the inflammations which complicate them are truly asthenic. In the inflammatory type of these fevers, the associated local alterations possess more of the sthenic characters. The same applies to continued fevers; the adynamic species being those in which the asthenic states of local action, and of structural change, are chiefly observed. Indeed, asthenic inflammations frequently appear in the course, and even constitute a principal part, of all infectious, malignant, and contagious maladies. In these, they present, generally, modified or aggravated characters; but still they are merely varieties of this state of local morbid action, depending upon the specific nature of the cause, and of the constitutional affection. This is exemplified by scarlatina, small-pox, plague, &c. The course of most of these specific forms of asthenic inflammation is very acute; the complication often accelerating a fatal issue.

71. iv. Terminations and Consequences.—*A.*

Asthenic inflammations *terminate* — 1st, in a return to a healthy state of action; — 2dly, in sphacelation or disorganisation; — and, 3dly, in dissolution without sphacelation, or without disorganisation so extensive as to be of itself productive of death. — *a. A return of the healthy state* of action is generally brought about by constitutional or local means, — by the former especially, or by both, — which are calculated to restore the vital powers, to impart tone to the relaxed capillaries and tissues, and to enable the part to secrete a more healthy pus, and to form coagulable lymph, by which the extension of the morbid action may be prevented. Thus it is necessary that the asthenic state should be changed into the sthenic before restoration can be accomplished; and this can be affected only by such means as will change the constitutional commotion from the adynamic type, — as will give energy to the organic nervous system, at the same time that they restrain excessive vascular action. As soon as the local disease and accompanying fever assume the sthenic conditions, reparation commences, and recovery takes place, as in these inflammations (§ 39.).

72. *b. Sphacelation* or *disorganisation* of the affected part may take place in very various grades. After the occurrence of either, the inflammation and disorganisation may cease to extend; the local action and febrile commotion may gradually or quickly assume a more sthenic character, particularly under restorative influences; the sphacelated portion may be thrown off, the disorganised part repaired, a suppurative action set up, and coagulable lymph thrown out around the seat of suppuration, whereby the surrounding structures will be protected, and the diseased parts more or less restored. Very frequently, however, when asthenic inflammations terminate in this way, the local mischief increases rapidly, and the general disturbance is aggravated, until life is at last extinguished. In these cases, the destruction of parts, either by sphacelation, or by phagedenic or sloughing ulceration, is generally so extensive, as to be incompatible with the continuance of life; but in those next to be noticed, the destruction of parts is not of itself sufficient to produce death.

73. *c. Dissolution, without sphacelation, or disorganisation,* so extensive as to account for the occurrence, is not an infrequent termination of asthenic inflammations. In such cases, the local affection is either merely the local manifestation of a severe constitutional malady, or is attended by a state of vital depression or exhaustion so extreme, as to terminate life, before it had advanced to the changes constituting actual disorganisation. In some of these cases, the result depends chiefly upon the morbid impression first made upon, and continuing to influence, the organic nervous energy, and in others it is partly owing to the morbid state of the blood, arising either from the same source, or from contingent circumstances or changes. When serous or mucous membranes are the seat of asthenic inflammation, a fatal termination is owing rather to the vital depression consequent upon the extent of surface to which the morbid action has been extended, than to the amount of disorganisation. This is evinced in many cases of general *peritonitis.* When a mucous surface engaged in the performance of vital actions is the seat of the disease, the powers of life often sink rapidly, both from the extent of surface affected, and from the interruption to the functions performed by it. This is shown in general *bronchitis,* and in certain states of *influenza.* Illustrations, moreover, of this termination of asthenic inflammations are often furnished by certain of the forms of disease caused by poisoned wounds, or by local injuries, and by some cases of *puerperal disease,* and even of *erysipelas* *, particularly when occurring in an infectious or epidemic form.

74. *B. Consequences.* — Asthenic inflammations give rise to certain changes which differ in some respects from those attending the sthenic form of the disease. It is necessary in practice to be fully acquainted with the differences between the results of both states of inflammation, especially as they are often so slight as to be overlooked, and as these results are generally essentially the same, but modified in character and in the period of their appearance. — *a. Effusion* of serous fluid is a very early consequence of asthenic inflammations. In parenchymatous or cellular parts it produces the extreme swelling (which is in some cases and situations œdematous or quaggy) attending the disease; and, in serous membranes, it often takes place to a great extent, and is in all respects an *effusion,* rather than an *exudation.* The appearance of the effused fluid varies much with the state of the disease, and with the degree of vital power and vascular reaction. In proportion as power is depressed, is the effused fluid ichorous, foul, abundant, and dark or discoloured; probably from some of the blood-globules, or of the colouring matter, having been effused with the serum. Hence it is, in some instances, almost sanguineous. As vascular reaction is increased, the fluid is turbid, flocculent, sero-albuminous, or sero-puriform; the situation and other circumstances attending upon the effusion modifying its character. The puerperal state, and the persistence or suppression of the discharges and secretions attending this state, modify remarkably the characters of the effused fluid, as in the asthenic peritonitis associated with adynamic puerperal fever. The fluid effused from the mucous surfaces is also much modified from that exuded during sthenic inflammatory action: it is usually less mucous and less albuminous, and more watery, serous, ichorous, or sero-sanguineous, as in cases of adynamic DYSENTERY (see § 26, 27.). It is sometimes glairy as well as watery; and when vital power is extremely depressed, it is very dark-coloured, offensive, and sanious. When sthenic inflammation passes into the asthenic state, owing to failure of the powers of life, or to morbid states of the blood, the effused fluids also pass from a consistent and coagulable, to a fluid and ichorous, state. The fluid, effused during asthenic inflammation of cellular parts, also partakes more or less of the characters just mentioned. It is deficient in albumen or coagulable lymph, and hence more readily infiltrates the surrounding tissues; and when it is of an ichorous nature, it seems to contaminate the parts to which it extends. Thus asthenic inflammation of cellular tissues is never limited by the effusion of coagulable lymph, unless a change be

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* In 1836, erysipelas prevailed most generally and fatally in the Orkney Islands. Its infectious nature was fully demonstrated on many occasions. It assumed a low or adynamic form, and the deaths from it were more numerous, for the period of its continuance, than from any other disease that had prevailed within the memory of the oldest practitioner.

produced in the general and local disease by means hereafter to be pointed out; and then lymph is formed around the seat of morbid action, agglutinating the areolæ of the tissue, and becoming a barrier between the morbid matters effused in the central diseased parts, and the healthy structure.

75. *b. Softening* is the next early consequence of asthenic inflammation, and one of the most remarkable. It is evidently owing to the extreme prostration of vital power in the part, causing a loss of the vital cohesion of the tissues, progressive with the disease. I have seen the softening so extreme, that the structures have been torn with the utmost ease after death, although the examination was made whilst the body was still warm. When this state of morbid action affects cellular and mucous parts, the softening and want of cohesion are equal to that of wet bibulous paper. They are often also very remarkable when the serous membranes have been implicated. In some cases of infectious puerperal fevers, complicated with asthenic peritonitis and hysteritis, I have found the peritoneum, and even the substance of the uterus, not only discoloured, but so softened as to be torn with the utmost ease.

76. *c. Suppuration* of a truly restorative nature is met with chiefly when the morbid action verges towards the sthenic type. Purulent matter is frequently found in parts asthenically inflamed, and is often secreted from surfaces thus affected; but it is generally offensive, and otherwise modified from that described above (§ 47.). It is often tinged, particularly in cellular and mucous parts, with the colouring substance of the blood. As the puriform matter, secreted by this state of action, is not confined from the adjoining structures by the effusion of coagulating lymph, and by the cysts thereby formed, it is frequently partially absorbed into the circulation. It thus contaminates the blood, and aggravates both the constitutional and the local disease, — rendering still more morbid the secretions and excretions, as well as the discharge from the seat of inflammation. When the matter passes to a more perfect pus, the change depends upon an improvement in the local and general action, and is an indication of commencing restoration, if unfavourable influences do not come into operation. Mucous and serous membranes often secrete a puriform fluid, presenting characters, varying with the states of vital power and of vascular action, when asthenically inflamed, and generally in a very large quantity. The asthenic bronchitis attending severe cases of *influenza* generally gave rise to a copious secretion of a thin muco-puriform fluid; and the effusions into shut cavities, in some cases of complicated erysipelas, of puerperal fever, &c., consist of a sero-puriform matter, occasionally tinged with blood, or otherwise modified.

77. *d. Ulceration* from asthenic inflammation is characterised by a rapid loss of substance, and its consequent extension. The edges and bottom of the ulcers are softened; sometimes not materially, if at all, elevated; and occasionally not much discoloured, or even inflamed. In other instances they are foul, dark, phagedenic, or sloughing. The discharge from the ulcers is usually ichorous, sanious, sometimes slimy and watery, and always offensive. The loss of substance is in them more owing to deprivation of the vital cohesion of the tissues at the diseased surface, and to the liquefaction or admixture of the dead molecules in the fluid discharge, than to absorption; which, however, takes place to some extent. When the ulceration is sloughy or gangrenous, and the discharge copious and very offensive, it is chiefly owing to the former. In some of these cases, the loss of vital power and cohesion is much more rapid than the solution of the molecules in the discharge, and then large sloughs cover the ulcerated parts. In some instances, the sloughy appearance proceeds from the more consistent or albuminous portion of the discharge having attached itself to the surface, whilst the fluid part either is dissipated by evaporation, or has passed off. This, however, is observed chiefly when a change to a more sthenic action takes place in the inflamed tissues. When absorption proceeds rapidly on the ulcerated surface, the constitutional symptoms are thereby greatly aggravated, and an unfavourable termination accelerated. Asthenic inflammations of the mucous surface, and particularly of that of the bowels, are often followed by ulceration, which occasionally presents a sloughing or phagedenic appearance. (See DYSENTERY, § 54. 56.)

78. III. MODIFICATION OF INFLAMMATION BY STRUCTURE. — Inflammation has been considered above, chiefly with reference to vital power and vascular action, without, however, overlooking the modifications depending upon structure. On this latter part of the subject, a very few general remarks may yet be added. — Dr. C. SMITH first ascribed the differences of inflammation to differences of tissue; and the writings of BICHAT, PINEL, BÉCLARD, GENDRIN, and others, have tended to give very general currency to these views, and to carry them much beyond their legitimate value. Structure certainly modifies, not only the course and terminations, but also the results or products of inflammation. But still the chief sources of difference are, the states of vital power and of vascular action. Besides, inflammation of an organ or part is not limited to a single constituent tissue of that organ, although it may have originated in one tissue only. It usually implicates two or more; although the cellular tissue, being, as it were, the matrix of the rest, is that chiefly affected. When inflammation thus extends to different textures, its characters, terminations, and consequences are modified more by the vital conditions above insisted upon, than by differences of structure; and, even when very differently organised parts are affected, the consequences of the morbid action in all of them are often very nearly the same, and are obviously owing chiefly to the states of vital power and vascular action. Even when mucous or serous surfaces are inflamed, the morbid action is seldom confined to them, the connecting cellular tissue being more or less implicated, and frequently also the adjoining structures; but the results and terminations of this action chiefly depend upon the constitutional affection; or, rather, the local and the general disease are both consequences merely of the morbid states to which they have been just ascribed, and are hence more intimately dependent upon them than upon other circumstances. In the present day, so much has been imputed to structure and to its modifications, natural and morbid; and alterations of function, of

sensibility, and of action, have been so generally connected with lesions of organisation, both by teachers and writers, as to mislead those who are seldom at the trouble of thinking, for themselves, or of attending to the suggestions of common sense in medical observation and reasoning. Organisation, function, and disease are so frequently viewed in connection; and function is so generally considered as resulting from structure, and disease from alterations of structure, that the principle which not only endows, and regulates, and controuls, and ultimately arrests, the functions, but also alters the whole organisation, is left out of the question; and the results of observation in respect of its various conditions and agencies — the circumstances which modify these conditions, and which change its manifestations in the various organs, either from healthy to morbid states, or from the latter to the former — are either insufficiently appreciated, or entirely neglected. Too much is ascribed to the material and gross effects, whilst the conditions out of which they arise are kept out of view, in respect both of their primary operation, and of their continued influence.— It is unnecessary to add any thing to what is advanced on the modifications of inflammation by structure, in the various articles where the pathology of the different tissues and organs is fully discussed.

79. IV. Diagnosis.—*Inflammation may exist in internal parts without being evinced by the usual local and general symptoms*; *and the parts affected by it during life may present very few or even no indications of it after death*; whilst *some affections closely resemble inflammation, and certain appearances very nearly approach those produced by it in the tissues.* To each of these points the *diagnosis of inflammations in general* has especial reference.

80. *A.* Inflammation may be so *latent*, or so *obscure*, owing to the absence of the most important symptoms, and to its seat, as to be recognised with great difficulty. The more slight and chronic forms of inflammation are those most frequently latent or concealed; yet, the most acute states, especially of an asthenic form, and occurring in states of the system characterised by impaired sensibility, or in viscera whose organic sensibility is naturally low, are often latent or obscure. These *concealed inflammations* have been noticed by Hoffmann, Baglivi, Stoll, Weinholt, Mayer, Meckel, Reyland, and Hartmann, and been frequently observed in certain epidemics. They are more common in some organs than in others, especially in the course of adynamic and typhoid fevers, and in other complications. Although they may be expected to exist chiefly, if not altogether, in parenchymatous structures, where the organic sensibility is the most obscure, yet they are not infrequent in serous and sero-fibrous tissues, which are usually acutely sensible in the inflamed state. A morbid condition of the blood, as well as a generally impaired state of sensibility, seems to diminish sensibility in inflamed organs; for the *consecutive* or *secondary inflammations*, which proceed from pre-existing inflammation or disease, are commonly latent or concealed. — *a.* Epidemic fevers are very frequently complicated with acute asthenic inflammations, which seldom betray themselves during life, owing both to the depressed state of organic sensibility, and to the condition of the blood. The brain, the lungs, the liver, the kidneys, the digestive and the respiratory mucous surfaces, are the most liable to be thus affected, without indicating, upon the strictest examination, the extent of mischief; even auscultation, percussion, and pressure, often failing in furnishing the usual evidence of it. Inflammations, however, of the respiratory organs would much more frequently be concealed, if these means of investigation were not resorted to. Indeed, in fever, in influenza, and in various epidemics, pneumonia would almost always be concealed without these aids. Inflammation of the abdominal viscera, during these and other maladies, often, also, does not become manifest, unless upon the strictest examination of the stools, the urine, and the patient's position in bed; and upon the closest observation of the effects of pressure, &c.

81. *b.* Inflammations of serous and sero-fibrous structures are not infrequently latent, especially when they commence gradually and proceed slowly, or when they appear under the same circumstances as have just been mentioned. Pleuritis and pericarditis, in chronic forms, and as complications of febrile or epidemic maladies, are often concealed; and, although less frequently so when auscultation and percussion are employed, yet they often escape detection, especially when they give rise to little effusion, until disclosed by examination after death. The same is observed, although much less frequently, with respect to peritonitis, which, however, often supervenes in more or less obscured states in the course of adynamic fevers. — *c.* Concealed or obscure inflammation of mucous surfaces, especially of the digestive, is remarkably common. Many of the disorders attributed to disturbed function merely, are actually slighter states of inflammation. But much more severe and even acute forms of the disease may exist in this tissue, without the usual evidence of them having been furnished; and may run on to disorganisation and even to death. This, however, chiefly occurs in the course of continued fevers, and in the other circumstances just mentioned.

82. *B.* Various *febrile diseases*, and *painful* and *spasmodic affections*, so closely resemble inflammations as to be distinguished from them with difficulty. — *a.* Several internal inflammations are liable to be mistaken for the more *sthenic forms of continued fever*; and that is the more likely to occur when the latter become complicated, particularly at an early period of their course. But internal inflammations, especially those of a sthenic character, present, amongst the earliest phenomena, some, at least, of the principal symptoms of inflammation, even before the chills or rigors take place, which usually attend their development. The disease is strictly local from the commencement, and is not attended by the vital depression, and loss of muscular power, which not only accompany, but also precede, idiopathic fever. In the former, the fever is sympathetic of, and contingent upon, the local affection; in the latter, the inflammatory complication is a contingency or accident, arising either soon after the commencement, or in the course of the constitutional malady.

83. *b. Painful affections* of internal or concealed parts are liable to be mistaken for in-

flammation. But violent pain is not always an attendant upon inflammatory action, and unless in very acute cases of pleuritis and peritonitis, the pain of inflammation is seldom so severe as that which is dependant solely upon nervous disorder. It is only when the pain is attended by increased vascular action and heat of skin — by symptomatic fever, or, at least, by some degree of vascular excitement; by heat or tension in the vicinity of the pained part; and by a white, loaded, furred, or excited state of the tongue, and high-coloured urine; and when it is increased by pressure; that it becomes an indication of inflammation. The pain of nervous disorder is intermittent or remittent; it often suddenly ceases for an indefinite time, and as suddenly re-appears. It is not attended by a sense of burning, or of heat or of throbbing, and it is generally eased by firm pressure; whereas the pain of inflammation, when severe, becomes gradually so, is continued, although often exacerbated at times — is frequently throbbing, and is always associated with very marked disturbance of the functions of the pained part.

84. *c. Spasmodic disorders* are often referred to inflammatory action; and about twenty-five years ago, when blood-letting was the alleged cure for every thing, and for these disorders especially, they were firmly believed to proceed from this source. However, like painful affections, they are more frequently purely nervous, or independent of inflammation. It is true that they may be complicated with one or other of its forms, and that either painful or spasmodic affections may proceed from congestion, or active determination of blood to the organs thus affected, or to parts in their vicinity; but still these are not inflammation. Both classes of disorder most frequently proceed from some unnatural excitement or irritation at the origin, or in the course either of the nerves supplying the painful or convulsed part, or of those connected with them. Thus irritation of the intestinal or uterine nerves will produce pain or spasm, or both, in remote parts, by their *direct* and *reflex sympathy:* and the irritation of calculi in the kidneys will occasion colic by the *direct sympathy* of the ganglial nerves, and pain or spasm of distant voluntary parts, by the *reflex sympathy* of the cerebro-spinal nerves. (See *Direct and Reflex Sympathy*, in my Edition of Richerand's *Elements of Physiology*, edit. 1824, and 1829, p. 546.)

85. *d. Determination of blood* to particular organs may also be confounded with inflammation; and it may run on to the more sthenic forms of the disease, either in acute or in chronic states. But care should be taken to distinguish between them. I have, in the article Blood (§ 25.), entered fully upon the consideration of *local determination of blood*, and upon the differences between this affection and *inflammation;* and have shown, that whilst the *first* of these consists only of augmented circulation and functions of a part, and is unattended by symptomatic fever, or any other alteration, the *second* is an actively morbid state of the organic nervous influence, and of the vessels of a part, accompanied by symptomatic fever, and tending generally to change of structure, and often to disorganisation. In the *former* the functions are usually increased, or inordinately excited, the organic sensibility being either unaffected or not sensibly excited; in the *latter* the functions are rarely increased, but always much deranged, or entirely suppressed — organic sensibility being early excited or disordered, and generally sensibly disturbed. (See art. Blood, § 25—33.)

86. *e. Congestion of blood* in one or more organs has also been mistaken for inflammation, both during the life of the patient, and in examinations after death. In the article Congestion, I have defined it to be deficient vital tone or power, chiefly of the veins of an organ or part, occasioning accumulation of blood in them, and a languid or retarded circulation, the functions of the organ being thereby proportionately disordered. The pathological relations, terminations, appearances, and symptoms of this form of disorder, are there so fully described, that it is unnecessary to notice, at this place, the distinctions between it and inflammation, farther than that, in the *former*, the functions of a part are generally more or less impaired, without the organic sensibility being morbidly excited, and without symptomatic fever being present; in the *latter*, there is not only disturbance of functions, but also exalted or disordered sensibility and vascular action, and more or less febrile commotion. The one is a morbid state of the capillaries and arteries, originating in the organic nervous influence of a part, with which state the system generally sympathises; the other is an engorgement of the veins, sometimes extending to the capillaries, owing either to a mechanical obstruction to the return of blood through the former, or to deficient vital energy of the affected organ. — The blood in congested capillaries and veins is of a purple or black hue; whilst that in the capillaries of inflamed parts is much more red or florid. (See art. Congestion of Blood.)

87. C. There are *certain appearances observed after death*, which are often difficult to be distinguished from those consequent upon inflammation. — *a.* The *congestion of blood* from mechanical obstacles to the circulation in the veins will not be mistaken for inflammation, if the exact state of the congested tissues, and if the course of the venous trunks, be carefully observed. It is in mucous membranes especially that the diagnosis is at all difficult, and in them only when the redness presents a ramiform appearance. In congestion from this cause the veins are full, often tortuous, and rarely varicose, — states not existing in inflammation; and the obstruction is commonly organic disease of the liver, or of the heart, or of the lungs, or the pressure of some tumour on large veins. Mechanical congestion sometimes, however, gives rise to inflammation, or is associated with it, and then the difficulty of diagnosis is much increased; but the state of the tissues, the capillaries of which are thus congested, and the presence of one or other of the usual consequences of inflammation, will generally lead to a correct conclusion. Dr. Macartney mentions, in his work on *Inflammation*, which appeared as this article was passing through the press, that the arteries of a congested part are smaller than natural, and that he verified the fact by experiments; the corresponding arteries to the veins, which were congested by tying them, being very much reduced in size.

88. *b. Congestion from position or gravitation* is much more likely to be confounded with inflam-

mation, than that produced by mechanical obstacles; but attention to the relative situation of the congested part, especially with reference to a depending position and gravitation of the fluids, will generally aid the observer. When congestion of the capillaries is present, where gravitation could not aid in causing it, and when there is no manifest mechanical obstruction of the veins, it must be ascribed to inflammatory action, although the usual consequences of such action are absent, for the inflammation may have been too recent to have given rise to them.

89. *c. Redness from inbibition*, or from the dyeing of the internal coats of vessels by the colouring matter of the blood is sufficiently discussed in the article on *Diseases of* ARTERIES (§ 38.). It is of a scarlet red; is limited to the lining membrane of the vessels; and is unconnected with any change in them, or with any capillary injection, or congestion of the vasa vasorum: whereas inflammatory redness in the internal surface of vessels is less uniform than it; is more dull or pink coloured; extends to all the coats, although in different degrees; and is accompanied with capillary injection, with softening and opacity of the inner membrane, with thickening, serous infiltration, &c. of all the tunics.

90. *d. Inflammation sometimes leaves no marks of its existence after death.*— This occurs chiefly in the inflammatory affections of the skin, and in slight or incipient inflammation of serous membranes. But the redness attendant upon the disease is more frequently diminished after death, than altogether banished. The inflammatory redness of the skin, and mucous and serous membranes, attending the exanthemata, and continued fevers, often partially or wholly disappear after death: yet these structures present appearances which may be inferred to have resulted from inflammation, and to have been associated with redness and vascular injection during life, even although the fact had not been demonstrated to the senses. When the skin has been affected, it usually assumes a purplish hue in the seat of affection, and the cohesion of the cuticle to the subsequent tissue is early diminished, so that it soon may be detached with ease. The vital cohesion also of mucous and serous membranes is impaired more than is usually observed, although all redness has disappeared, and, in these parts, as well as in the skin, and cellular tissue, decomposition makes a more rapid progress than in the healthy structures. Vascular injection and redness may have vanished more or less, even in situations, and in forms of inflammation, where some one of the usual consequences of the disease is present. In this case, however, there can be no doubt of its nature.

91. V. CAUSES OF INFLAMMATIONS.—i. CONSTITUTIONAL AND PREDISPOSING CAUSES.— *a. Age* has considerable influence upon the production and progress of inflammation. The disposition, particularly to the more sthenic and acute forms of the disease, is greatest in childhood and youth. It may be said to diminish gradually from infancy to old age, whilst the more chronic and asthenic states become more frequent as age advances. The brain and membranes, the lungs and mucous surfaces, the skin, the serous surfaces within the thorax, and the glands, are the most frequently affected in children and young persons; and the digestive, respiratory, urinary, and generative organs, at more advanced epochs of existence, and generally in the order in which they are here enumerated.

92. *b. Sex* has but little influence in predisposing to inflammation. Males are more frequently affected, chiefly because they are exposed more than females to other predisposing, and to many of the exciting, causes. Females are most predisposed to inflammation at the commencement, during the continuance, and for some time after, the disappearance of the catamenia, and during the puerperal states, especially after parturition.

93. *c.* Of *temperaments* and *diathesis*, the most influential are the sanguineo-melancholic and irritable; the scrofulous, gouty, and rheumatic. It is chiefly owing to the descent of temperament and diathesis to the offspring, that inflammations sometimes present an *hereditary* tendency.

94. *d. Habits* and *modes of life* dispose to inflammations of various organs. Persons who are exposed to the open air, and to atmospheric vicissitudes, or who take active exercise in the air, are liable to inflammation of the respiratory organs; and inflammatory diseases generally assume a sthenic or acute character in them. Those who are indolent, sedentary, or confined to warm or close apartments, and unhealthy localities, are most subject to inflammations of the digestive, parenchymatous, and excreting viscera, particularly the excreting organs in the abdomen; the morbid action very frequently assuming either asthenic or chronic forms. — The influence of *modes of life* in predisposing to, and exciting, inflammatory maladies, is fully shown in the article on ARTS AND EMPLOYMENTS.

95. *e. Food and drink.* —The liberal use of animal food favours the occurrence of every form of inflammatory action, or generates an inflammatory diathesis. It is even very probable that certain kinds of animal food predispose to morbid vascular action in some structures in preference to others. The frequent or habitual use of pork seems to dispose chiefly to inflammations of the glands, joints, and bowels; and aids in generating a scrofulous diathesis. The laws of MOSES, with reference to animal food, have evidently had a salutary influence in rendering scrofulous, gouty, and inflammatory diseases less frequent among the Jews than in any other class of the community. In warm climates especially, the use of pork, and of the viscera and blood of animals, cannot fail of being prejudicial; and there cannot be a doubt that the proneness to inflammations among Europeans, in hot climates, arises chiefly from the quantity of animal food and exciting liquors consumed by them. Persons who live much upon fish are liable to inflammatory affections of the skin and digestive mucous surface; and, whilst flesh meats favour, in temperate climates, a sthenic form of inflammatory action, living much on fish disposes chiefly to the more asthenic and chronic states.

96. Exciting or *intoxicating beverages* predispose to, and often directly excite, inflammation, particularly of the digestive and urinary organs. The habitual use of these liquors frequently induces and keeps up morbid vascular action, chiefly of these parts, of a sub-acute or chronic kind, generally passing into confirmed structural change. These effects most commonly follow the use of spirituous liquors; and, next to these, new wines

and malt liquors are most prejudicial. Persons who use much of the former soon become subject to enlargements and obstructions of the abdominal viscera, consequent upon repeated or protracted inflammatory action; and those who drink the latter in large quantities, and who, at the same time, are very actively employed in the open air, as coal-heavers, draymen, &c., are liable to the most acute attacks, often attended by the most violent constitutional commotion, and terminating rapidly in disorganisation of the inflamed part.

97. *f. A plethoric habit of body,* — the more immediate consequence of diet and regimen, — remarkably favours the occurrence of inflammations. Persons who live fully, and take insufficient exercise, are extremely prone to these diseases, when exposed to atmospheric vicissitudes, and to cold, particularly if the body is quiescent, as when a person is carried rapidly through the air in an open carriage. Persons in large towns or cities, accustomed to warm close rooms, or engaged in sedentary occupations, and living fully, when called to a distance, often travel on the outside of coaches, or in open carriages, and are surprised when they are attacked by inflammations, the slighter forms and earlier stages of which they usually neglect. The surprise would have been, if they had escaped. In the article BLOOD, where the subject of vascular plethora and determinations of blood are discussed (§ 13. *et seq.*), I have shown how much fulness of the vascular system disposes to inflammatory action, and how frequently the latter follows as a consequence, or as a higher grade, of the former. When this system is overloaded, some part is liable to experience over-distention and augmented flux, which often soon passes into morbid action, the balance of circulation being readily disturbed by external and internal — by physical and mental, causes. In the article referred to, I have stated the connection often existing between congestions, general and local plethora, local determinations, and inflammations. Congestions and local plethora are frequently dependent upon the state of the venous circulation; and this upon obstructions in the liver, lungs, or heart; the efforts made to propel the blood in the capillaries, particularly under the influence of stimuli, readily inducing inflammation, especially of an asthenic kind. These states of vascular fulness, thus originating and predominating in the veins, are most common in persons advanced in life. On the other hand, local determinations of blood proceed chiefly from capillary expansion and arterial action, without venous obstruction; are most commonly observed in the young and those in the prime of life; and most frequently pass into the sthenic forms of inflammation.

98. But there are other states of the vascular system, upon which as much, probably, depends, not only in disposing to, but also in exciting, morbid vascular action, as upon vascular fulness; and to which very inadequate attention has been paid. These are the accumulation of effete and hurtful materials or elements in the blood, owing to imperfect depurating function. When the excreting functions of the kidneys, of the skin, of the liver, and even of the large bowels, are inadequately performed, the excess of hurtful, highly animalised, and irritating substances in the blood, as urea, &c., both predisposes to, and excites, inflammation in parts most susceptible of this cause of irritation, from previous disorder, or peculiarity of structure, or function. Irritating matters also may be carried from the digestive organs, or other parts, into the blood, where they may act in a way similar to those just mentioned. Thus inordinately exciting articles of food or drink, accumulated excrementitious matters in the biliary organs and intestinal canal, and morbid secretions pent up in any part of the body, are often absorbed into the circulation, and produce inflammations, varying in character with the kind of morbid matter producing it. (See art. ABSORPTION.)

99. *g.* The *influence of the digestive organs* in the production of inflammations has been acknowledged, since it was insisted upon by JOHN HUNTER. But it is very probable, that the disorder of these organs, thus predisposing to inflammations, and the predisposition itself, are associated effects of deranged organic nervous influence. There can be no doubt, however, that when the functions of the stomach and bowels are disordered or impaired, and when the liver is torpid, and accumulations of bile are formed in the biliary ducts or gall-bladder, a predisposition to inflammations is not only thus induced, but also a greater tendency to asthenic action is thereby generated. The state of the digestive organs often indicates the degree of organic nervous power attending upon the disease; whatever deranges their functions, or aggravates existing disorder in them, increasing the general and local affection, and changing sthenic to asthenic action. The disorder induced in the organs of digestion generally extends to the organs of excretion, not only by the direct sympathy arising from nervous endowment, and from the dependence of both classes of organs upon the same nervous influence, but also by the changes produced by the former in the circulating fluids, — the predisposition to morbid vascular action being accordingly heightened.

100. *h. Mental emotions* also favour the occurrence of inflammation, when excessive. Violent fits of passion may even excite the disease, particularly in the brain, liver, or heart. The depressing passions, when extreme or of long continuance, induce the more chronic or asthenic states of morbid action, or cause the sthenic disease to assume either of these forms. The exhaustion consequent upon protracted or excessive nervous sensibility, and upon pain, has a similar effect. When pain is very violent, it seems to act like to concussion of the nervous masses or of the body, and to severe crushing injuries or wounds: — they all depress organic nervous power, and, when inflammation takes place, give rise to an asthenic or spreading form of the disease.

101. *i.* A predisposition to inflammations is often inherent in the frame from *hereditary conformation* or temperament (§ 93.), and from *previously disordered states* of certain organs or tissues. Parts which have been formerly inflamed are most prone to experience a recurrence of the disease. Organs which are liable to simple excitation, or to actively increased function, are generally much disposed to the different grades of sthenic inflammatory action; whilst those which are torpid, debilitated, or exhausted, are most prone to the asthenic states. Persons whose mental faculties have been inordinately exercised, are most disposed to inflammations of the brain and their consequences; and

those who have over-excited or exhausted the digestive organs, by too much or too rich food, and by intoxicating liquors, are most liable to inflammatory affections of the stomach, liver, and bowels.

102. *k.* The influence of *temperature, season, and climate* is shown, not only by their favouring the appearance, but also by their modifying the characters and forms, of inflammations. High ranges of atmospheric heat produce inflammations of the liver, stomach, and brain; and, if heat be conjoined with humidity, these diseases assume a low or asthenic form, the bowels being frequently also affected. Prolonged high temperature, especially when aided by humidity, changes the state of blood, affects the biliary functions, and imparts a peculiar character to inflammatory diseases. Thus in autumn, after hot summers, these maladies are frequently associated with marked gastric or bilious disorder; and in winter and spring, when the air is cold and humid, they often present an erysipelatous or catarrhal form. A cold and dry state of the air is generally wholesome, if due exercise be taken; and, without favouring the occurrence of inflammations, imparts to them an acute and sthenic character, the respiratory organs being the most liable to be affected. But there are other conditions of the air, or prevailing atmospheric constitutions, which dispose to inflammations, and bestow upon them, for a certain period, peculiar forms or features. The sources of these have not been ascertained, although they may probably be referred to electrical states and terrestrial emanations. However these prevailing constitutions may arise, there can be no doubt of their influence on inflammations, and of the necessity of ascertaining their nature and effects, as being requisite to an appropriate and successful method of cure.

103. From what has just been advanced, the influence of *climate* on inflammatory diseases may be partly inferred; for as the climate partakes the most of either of the foregoing characters, so will these diseases be prevalent or be modified. In cold, variable, and humid climates, inflammations of the respiratory organs, and the rheumatic and scrofulous diathesis, are most common. In warm humid countries, inflammatory action appears chiefly in the liver, digestive canal, and spleen; and especially when exhalations from the soil also come into operation, it either assumes, or rapidly passes into, asthenic forms.

104. It should be kept in recollection that several of these *causes of predisposition* sometimes act conjointly; that they may be sufficient of themselves to occasion inflammation, although they generally require the more efficient or determining action of the *exciting causes* next to be considered; and that as most of them either continue in operation during the disease, or are inherent in the constitution, *they exert a very marked effect upon the form, progress, and consequences of the disease.* Hence the necessity of ascertaining them fully, and of appreciating them correctly, in order to treat with success the disease they are concerned in causing.

105. ii. The EXCITING CAUSES are very numerous and diversified, but uncertain in their operation, or ascertained with great difficulty. — Many of the predisposing causes, owing to their more intense or combined action, sometimes of themselves produce inflammation; and in such cases, the effect does not always appear in very obvious connection with its real cause. In many instances of visceral inflammation, the exciting cause is very obscure, the disease proceeding rather from a combination of circumstances, — some of them of fortuitous occurrence, — than from any one very obvious agency. The more direct causes may be considered with reference to their *mode of action* in producing the morbid effect: — 1st, Certain of them act by injuring the organisation; — 2dly, Some excite the organic nervous sensibility of the part, and, consecutively, vascular action in it; — 3dly, Others operate by affecting the function and circulation of the organ; inflammation resulting from those alterations in connection with predisposition; — 4thly, Many produce a specific or truly morbid action in the part, changing the organic nervous sensibility, the vascular action, and all the vital conditions, both locally and generally; — 5thly, Morbid matters secreted by an organ, or carried into the blood from a diseased part, may occasion inflammation by their direct effect upon the capillary vessels, as well as in one or other of the above modes; inflammation of one part thus giving rise, by means of some one of its consequences, to inflammation of another; and the morbid secretions from one organ inflaming others, with which they come in contact.

106. *A. The causes which act by injuring the organisation* are chiefly all external injuries, which divide, lacerate, or bruise a part. — Structures cleanly divided by a very sharp instrument are much less disposed to inflame, than those which are lacerated, bruised, or punctured. — *Lacerated parts* undergo much greater injury of organisation than simple division; their nervous fibriles and vessels are torn, and both these constituents of structure are thereby severely affected, the vitality of the part being often either directly or consecutively destroyed, and sloughing frequently taking place. — Violent *contusions* sometimes so disorganise a part as to prevent it from recovering any share of vital action. It then soon dies, and is cast off, or the system sinks under the shock primarily experienced, and the depression consecutively caused by the extent of local mischief, without inflammation having been fully developed. When contusions are slight, they recover without inflammation taking place; but when the capillaries are injured, or when their contents have partially escaped into the tissues of the part, or even when their tone is so much exhausted as to admit of much effusion, and especially when the cohesion of the textures has been more or less altered or overcome, inflammatory action is very liable to occur, although it does not necessarily take place. — *Punctured wounds* readily induce inflammation, and generally in proportion to the bluntness of the instrument. A triangular or round instrument also produces it more readily than a flat and sharp one. The disposition to inflammation from punctured wounds chiefly depends upon their extent, upon the nature of the structures which are implicated by them, upon the quantity of blood effused in the parts which they have penetrated, and upon the state of the constitution. Punctures of tendons, nerves, capsules, and aponeuroses, are much more injurious than of other parts; and the constitutional affection, in relation to the local injury and resulting inflammation, is very much greater. When much

blood is effused without a sufficient outlet, the punctured part being distended by it, and when blood is effused at the bottom of the wound, or in surrounding tissues, inflammation readily takes place, this fluid usually exciting inflammation in parts to which it is naturally foreign. The effects frequently also depend upon the nature of the body by which the puncture has been made. The teeth, claws, spurs, and spines of animals and fishes, generally produce very severe and even dangerous injuries, the punctures inflaming readily and rapidly, although no poisonous fluid has been inserted in them.

107. *Concussions* or severe shocks are often followed by inflammation. The parts which suffer from this cause are chiefly the brain, the spinal chord, the liver, and spleen. It is not only organic nervous power that is dissipated or exhausted in such cases, but the organisation is often more or less changed — minute lacerations of structure, or of capillary vessels, and consequent effusions or ecchymoses, being often found. The suspension of the functions caused by concussion is remarkably prone to pass into inflammatory reaction, when this species of injury does not altogether extinguish them. — Severe or prolonged *pressure* of parts often causes an asthenic inflammation of them, quickly passing into ulceration or gangrene. The *removal* of a gradually increased or continued pressure is often followed by a local and general inflammatory reaction, which in some cases, and as respects certain structures, becomes very acute, as in the peritonitis consequent upon parturition, and upon tapping dropsies of the abdomen. — *Ligatures*, or other causes of constriction, act by impeding the venous circulation; and various *positions* have a similar effect. They also aggravate inflammation when otherwise produced.

108. Various substances affect the organisation of a part, so as to induce inflammation, especially *mineral substances*. When these are applied in concentrated states, they destroy the organisation, inflammation appearing around the injured part. The pure alkalies, the strong acids, and certain of their salts, have this effect. But in weaker states, they inflame the tissues in the mode next to be considered (§ 109.). The bichloride of mercury, arsenious acid, &c., in an undiluted state, decompose or destroy the vital cohesion of the part; but in a weaker state they affect the organic sensibility and vascular action, thereby causing inflammation, and certain of its consequences. — *Extremes of temperature* affect the organisation almost directly, although in less grades; they act chiefly in the manner just mentioned.

109. *B. The causes which excite the organic nervous sensibility and the vascular action of the part*, are all those substances which are classed as stimulants or irritants. They act directly, and chiefly, on the parts to which they are applied. Inflammations of the skin, intestinal canal, urinary organs, and even of the respiratory passages, generally proceed from these sources. Prolonged friction, flagellation, the application of any of the above substances to the skin, or the ingestion of them into the stomach, and high ranges of temperature, produce inflammation in this way. Volatile or diffusible stimulants, irritating gases, and fine particles of mineral or vegetable substances, floating in the air, often inflame the respiratory passages. The atmospheric air, especially the oxygen of it, frequently inflames parts whose organisation is not suited to exposure to it. When the serous membranes of shut cavities are exposed to the *air*, they first become dry; afterwards more vascular than natural; and ultimately covered with a thin exudation of lymph, varying in thickness, and in the proportions of serum and coagulable albumen, with the intensity of vascular action, the constitution of the patient, and the powers of life. Mucous surfaces deprived of their epithelium, the skin without its cuticle, and other exposed or divided textures, are similarly affected; inflammation frequently supervening, unless when the lymph thrown out coagulates over them, and completely protects them from the air; and then the process of restoration usually takes place underneath the protection thus formed. Stimulating substances may be taken into the stomach, and pass from it into the circulation, without materially affecting the digestive organs, and yet they may inflame the organs by which they are excreted. Thus, cantharides and turpentine cause acute nephritis; and spirituous liquors, and the prolonged exhibition of iodine, excite chronic inflammation and organic lesion of the kidneys, giving rise to dropsy. Low ranges of temperature also sometimes occasion inflammation — not, however, by directly exciting the nervous influence and vascular action, but by remarkably depressing both, in the first instance; the consequent reaction proceeding to an excessive, severe, or prolonged state of inflammation. (See arts. Cold, and Gangrene.)

110. *C. The causes which affect the functions and circulation of an organ, aided by predisposition*, are numerous, and, like the preceding class, hardly admit of enumeration. Whatever inordinately excites the natural actions, and thereby the circulation of an organ, or whatever primarily stimulates the vascular action of a part, will frequently occasion inflammation of it; for the increased function or circulation will run on to inflammatory action, whenever a strong predisposition is present in the organ or constitution. The energetic actions of the brain are attended by augmented circulation, which may pass into inflammation. Increased function of the liver is often followed by inflammation of it. Excessive indulgence of the appetite and excitement of the stomach often precede some of the forms of gastritis or enteritis. In these cases, the natural actions are first inordinately excited, and morbid vascular action is thereby induced. But, in other instances, the order of morbid procession is reversed: the causes increase the circulation in the organ before the function is materially deranged. Thus *cold*, instead of benumbing sensibility, and of giving rise to a morbid vascular reaction upon its removal, in external or other parts on which it acts, often determines the momentum of the circulation upon internal viscera and surfaces; and if these be not partially relieved from the load or congestion thereby occasioned, by a free exercise of their functions, inflammation is a frequent consequence. Interruption of the exhalation from the skin, constriction of the surface, and diminished circulation both there and in the extremities, combine to drive the blood upon the mucous surfaces, and parenchymatous viscera; increased function, augmented secretion, or morbid vascular action resulting therefrom, according to the states of constitutional power or of predis-

position, and to the continuance or intensity of the cause. When cold is not protracted or intense, relatively to the constitutional energy and predisposition of the individual, the internal functions, especially those of digestion, and of excretion, the urinary particularly, are increased, and inflammatory action does not take place; but when the internal determination is not relieved by augmented secretion, nor removed by a restoration of the circulation to the surface and extremities, inflammation of the predisposed organ is often the consequence. Sudden, continued, or frequent exposures to cold, vicissitudes of temperature, and partial exposure to currents of cold air, to humidity, &c., are the most common causes of internal inflammation, and especially of the respiratory organs. As respects these organs particularly, it is not the sedative influence of cold, acting upon exhaling surfaces, the seat of active organic functions, but the reaction consequent upon the removal of this influence, that occasions the inflammation; the primary influence of cold only disposing the part to inflame, when reaction takes place, or modifying the reaction, so as to cause it to run on to inflammation. Hence it is that persons, after going into a cold air from a warm apartment, generally escape inflammation of the air-passages, unless they be perspiring, or the predisposition to inflammation be strong, when they avoid a sudden return to a high temperature, by which reaction is liable to be morbidly increased; and hence the greater danger from exposure to much warmth after the prolonged or intense influence of cold, than from the cold without the subsequent injurious action of heat.

111. *D. The specific causes of inflammation*, whereby the organic nervous sensibility, the vascular action, and all the vital conditions are truly morbidly altered, both locally and generally, comprise all infectious, contagious, and contaminating matters, particularly when applied to an abraded surface or wound. Most of the substances forming the second and third classes of *infectious agents* (see art. INFECTION, § 4.), and arranged also under the head of ANIMAL POISONS (see that article), produce inflammation, presenting one or other of the local and general forms described under the asthenic species (§ 54. *et seq.*). The secretions and fluids of one person may excite inflammation when applied, as just stated, to another; but the effect is more certainly produced when these matters are taken from the dead body, and especially when they are the product of inflammatory or other disease. The serous, puriform, sanious, or sero-puriform fluids generated by specific or constitutional maladies, and by diffused inflammations of the peritoneum, or even of other serous surfaces, possess the property of exciting the asthenic or diffusive forms of inflammatory action in a very remarkable manner. The most dangerous effects generally follow the inoculation of these fluids from the recently dead, or from the still warm body, or even the application of them to the skin. The next most noxious effects result from the introduction of animal matter in a very far advanced stage of putrefaction. In both cases, but in the former especially, the constitutional affection is most severe (§ 59.). Even when the local injury is hardly to be perceived, as well as when it is more manifest—vesicles or pustules arising in its vicinity—inflammation extends through the cellular tissue in the course chiefly of the lymphatics or veins, sometimes implicating these vessels, and abcesses form under the muscles, particularly under the pectoral and other muscles of the chest; a great part of the cellular tissue on the trunk, and even the serous surfaces underneath, becoming implicated in the disease. Occasionally the inflammation presents the characters of some one of the varieties of *erysipelas;* the particular form of the local, as well of the general affection, depending upon the constitution and previous health of the patient, and upon the nature or properties of the animal poison. The most virulent of the morbid poisons seems to be the fluid effused in the large cavities, and particularly that found after puerperal peritonitis, in recently dead bodies. The recent brain, the substance of fungoid, carcinomatous, and medullary tumours, and the sanious fluids proceeding from diffusive, erysipelatous, and gangrenous inflammations, are also frequently productive of most noxious effects.

95. Although the most dangerous form of inflammation is caused by the fluids of the recent human subject, yet those of recently killed *animals* produce no such effect. This probably arises from death being caused in the former by disease, in the latter by bleeding, during a state of health. When, however, the fluids of animals which are either diseased or under the influence of inordinate excitement, or of its more immediate effects, are applied to a wound or denuded surface, the effects are often severe, although not so dangerous as in the former cases. (See arts. INFECTION, and POISONS — *Animal.*)

112. iii. CONSECUTIVE INFLAMMATIONS.—*Morbid matters secreted by an organ, or circulating in the blood, frequently produce inflammation of either neighbouring or distant organs.* — This is an important class of causes, and, like that immediately preceding, generally occasions the asthenic or diffusive forms of inflammation. When the natural secretions of an organ are rendered unusually morbid or irritating, either from perverted action, or from the accumulation of noxious elements in the blood, the canals through which they pass are often irritated and inflamed by them. The morbid bile formed during affections of the liver, or in the course of gastric, bilious, remittent, and continued fevers, often occasion the enteric or dysenteric complications occurring in these diseases. Inflammations of the colon and rectum also often arise from this cause, as well as those of the gall-bladder and bile-ducts. The secretions on the surface of the skin, especially when allowed to accumulate and remain on it, are the most frequent causes of cutaneous inflammation; and alterations of the urine often occasion inflammation of the urinary bladder. Indeed, most of the complications appearing in the course of febrile diseases, arise either from the morbid state of the secreted fluids, or from that of the blood itself; the organic influence being remarkably susceptible of their impressions, and the vascular system being readily excited by them to an increased action, devoid of power or healthy tone. When vital power or organic nervous influence is extremely depressed, as in adynamic, typhoid or exanthematous fevers, the parts with which diseased secretions come in contact are unable to resist the impression made by them, or to throw them off by means of a healthy secretion from their own surfaces, and by sthenic muscular action. Hence, this impression is soon followed by asthenic inflammation.

113. Morbid matters may also be *absorbed* from mucous surfaces, from hollow organs, or from the more solid structures in which they have been formed, and be carried by the lymphatics to glands, and even into the veins and general current of the circulation; and they may, moreover, be formed on the internal surfaces of the vessels themselves, contaminating the blood in either case, or altering it in such a manner as to excite inflammation in various different and distant organs. Sanious or morbid fluids may be taken up from the cavity of the uterus; and, passing into the veins and blood, occasion phlebitis or other forms of malignant puerperal disease. Morbid secretions in the intestinal canal may be absorbed and carried into the blood of the vena porta, and excite diffused or other forms of hepatitis; these results taking place the more readily, the more unhealthy the secretions are that are accumulated in these situations, and the more depressed the vital powers.

114. iv. SECONDARY INFLAMMATIONS.—Morbid matters, also, from *primary* inflammations, may excite *secondary* inflammations, — 1st, In the course of connecting cellular tissues or membranous surfaces; — 2dly, In lymphatics and absorbent glands; — 3dly, In veins; — 4thly, In parenchymatous viscera; — 5thly, In synovial capsules, &c.; — and, 6thly, In serous or mucous surfaces. The secondary disease, in either of these situations, is most frequent when the morbid matters from the primary inflammation are effused in the substance of a part without being confined or limited by a barrier or cyst formed by coagulable lymph, and when organic or nervous power is much depressed. — *a*. The *mode* in which the consecutive or secondary disease is developed, is different in most of these situations, and is perhaps doubtful as respects some of them. When the primary inflammation of *membranous surfaces* or of *cellular or adipose tissues* is asthenic, it is not only disposed to extend in every direction without any break or interval, but it often advances to distant or even remote parts, without the intervals presenting any manifest change, and after various intervals of time. Several states of erysipelas and diffused inflammation of the cellular tissue, and of mucous and of serous membranes, illustrate this. When the extension of the disease is continuous, the nature of the tissue, and the infiltration of the fluids from the primary inflamed part, are the chief causes of it, in connection with weak powers of resistance; but when a part opposite to, or adjoining, an inflamed surface also becomes inflamed, without the intervals between both being affected, the cause will generally be found to have been the fluids effused from the part first inflamed, which have acted as excitants or irritants of the healthy parts with which they have come in contact. Inflammations of serous, cutaneous, and mucous tissues frequently illustrate this fact. When distant parts are secondarily affected without admitting of this explanation, we can only infer that, as long as constitutional disease exists, so long will it continue to manifest itself locally or externally, or in some part or other of the same tissue which it is most disposed to affect, or in some other predisposed part.

115. *b*. In several asthenic, specific, and chronic states of inflammation, the morbid matter absorbed from the primary seat of disease inflames chiefly either the *absorbents* or the *glands*, or both the *lymphatics and glands*; the former often in their whole course, from the primary lesion till the glands are reached, the latter principally in the groins, arm-pits, and neck.—In either case, the connecting and surrounding cellular tissue is also inflamed, small abscesses are formed, or a diffused infiltration of a sero-puriform, sanious, or ichorous matter takes place in their vicinity, especially around the glands; and the disease is thus complicated and prolonged. The constitutional powers in these cases, are affected more and more seriously, owing to the effect produced either upon the organic nervous influence, or upon the vascular system and blood itself, or to these causes combined; but the local, and especially the general, disease presents characters having more or less reference to the primary or exciting cause, from which indeed it derives its specific characters, as when inflammations are caused by a specific animal poison.

116. *c*. The *veins* are often the seat of the consecutive inflammation, especially after the primary asthenic forms of the disease, or when the powers of life are depressed, — when the fluid products of inflammation are effused upon wounded or divided surfaces, or are insufficiently confined by the effusion of coagulable lymph, or by cysts, — and when morbid secretions remain long in contact with absorbing surfaces, or in situations where venous imbibition may take place, as in the cavity of the uterus after delivery, and on divided surfaces after amputations and other surgical operations. In these cases, the consecutive phlebitis assumes various characters, according to the constitutional powers of the patient. If the vital powers be not materially reduced, coagulable lymph is thrown out upon the internal membrane of the veins, and the blood is thereby coagulated in them. The circulation through them is thus arrested, and the products of inflammation are prevented from mixing with the mass of blood. In such cases, the inflammation sometimes extends to the more external coats of the vein, and small abscesses form externally to them, and press upon and obliterate their canals; the obstruction to the circulation in them thus occasioned, further preventing contamination of the fluids. In other cases, purulent matter is secreted within the vein, and is partially confined either by coagula or by albuminous exudations on the internal surface of the vessel, or by both; and, in some instances, even when these have been formed, the puriform matter has evidently mixed with the blood without coagulating it. When pus has been found in the centre of coagula, it is extremely probable, that it has caused the coagulation of the fibrinous portion of the blood in the partially obstructed vessel, and has thus become inclosed in the coagula. When the powers of life are extremely depressed, the secondary phlebitis is not limited by an effusion within the vessels of coagulable lymph, with or without pure pus, and by an extension of the inflammatory action to the external coats and connecting cellular tissue, as in the above states of the disease, but is rapidly extended along the internal surface of the veins; the morbid secretion from the surface not consisting of coagulable or healthy lymph, or even of pus, but of a sero-puriform or of a sanious or ichorous fluid, which is not capable of coagulating the blood in the inflamed veins, but which readily

mixes with it, and contaminates it, thereby producing all the phenomena of adynamic or malignant fever.[1] (See art. Veins — *Inflammation of.*)

117. *d.* Inflammations of *parenchymatous or other viscera* are often *secondary or consecutive* upon primary inflammation of remote or external parts. The brain, the lungs, liver, and kidneys are most frequently thus remotely affected. In these cases, there may be extensive inflammatory appearances without purulent collections; but most frequently one or more purulent collections, or distinct abscesses, or merely puriform infiltrations of the inflamed parts, are observed. In some instances, the puriform collections and infiltrations are attended either by very few marks of inflammatory action, or by almost none, so as to render it even doubtful, whether they have resulted from inflammation, or from a simple deposition, or separation, from the capillaries of the secondarily diseased part, of the morbid fluids absorbed into and circulating with the blood. I believe, however, that, in these cases, the morbid matter in the blood excites a sufficient degree of inflammatory irritation of the capillaries of this part, to form the diseased secretion infiltrating it; and that, as in other instances where inflammation has unequivocally existed during life, the principal indications of it, in the affected tissues, have vanished soon after death.

118. When secondary inflammation seizes upon a parenchymatous organ, remote from that primarily affected, it will generally be found that it is owing to the passage of the morbid fluids from the primary seat of inflammation into the blood, these fluids consecutively inflaming the parts most predisposed. In some cases the secondary disease has been preceded by, and is associated with, phlebitis; in others, this complication cannot be detected. Even in cases of primary, as well as of consecutive phlebitis, secondary inflammations of internal viscera, with purulent collections or infiltrations, are very frequent. But this subject is fully discussed in the articles Abscess, and Veins.

119. *e.* Consecutive inflammations of *synovial capsules*, and in *serous surfaces*, are observed chiefly in similar cases and circumstances to those just described (§ 115. 118.), — when the blood contains morbid secretions, or when the veins are inflamed and the powers of life much reduced. The former of these structures are often affected by the contamination of the fluids consequent upon syphilis, and upon the subsidence of confluent small-pox; the latter in the advanced stages of diffusive inflammation of the cellular tissue, or of phlebitis, or of inflammation of the lymphatics, particularly when either disease extends to the trunk. It also is sometimes consequent upon extensive burns or scalds, especially when the surfaces over the large cavities are primarily inflamed by these accidents.

120. *f. Mucous surfaces* are secondarily inflamed, both by the passage of the fluid products of primary inflammation over them, as when laryngitis or bronchitis supervenes upon an ulcerated cavity in the lungs, and by the absorption of these products into the blood. These surfaces, especially those of the large bowels, perform an excreting, as well as a secreting function, and the morbid matters, in the course of their elimination from the circulation, excite inflammatory action, generally of an asthenic form, not only in these surfaces, but also in other organs performing similar offices, as the kidneys, liver, &c. Thus secondary inflammation and ulceration of the large bowels, kidneys, &c., often occur in the course of tubercular excavation and ulceration of the lungs, and of abcesses in the liver.

121. VI. Prognosis.—The prognosis of inflammation can be stated only in general terms. The more special circumstances connected with this subject must necessarily be considered in the articles devoted to the inflammations of particular organs and textures; for the result will mainly depend upon the organ affected, as well as upon the form, severity, and stage of the disease, and upon the consequences which may have already taken place.

122. *A. As to the organ or structure affected*, it is unnecessary to state more than that the danger of inflammations is great in proportion to the vital importance of the affected part. Acute inflammations of the stomach, of the intestines, of the lungs, of the heart, of the brain, of the liver, and of the kidneys, are all attended by more or less risk, owing to the disturbance of function attending them, to the shock which the whole frame experiences from the attack, and to the consequences and changes of structure, or the disorganisation, which they often occasion. Yet the danger is still greater when the *blood-vessels*, whether arteries or veins, are inflamed; for the products of the morbid action are then liable to mix with, and to contaminate, the blood, and thereby to infect, in a very dangerous manner, the whole frame. — Inflammations of *serous membranes*, particularly at advanced stages, and in unhealthy subjects, are always attended by great risk of life; for the fluids effused by the disease either accumulate to a fatal extent in the shut cavities they form, if effusion be not early prevented or restrained, or agglutinate their opposing surfaces, so as to impede the functions of parts and to occasion dangerous consecutive disease. Much, also, of the risk attending inflammation of parenchymatous organs proceeds from the extension of the disease to their serous surfaces, and from the effusion consequent thereon. — Inflammations of *mucous surfaces* are much less dangerous than those already mentioned; and chiefly because the secretions which they produce favour a resolution of the morbid action, and are thrown off the diseased surface, — a source of irritation being thus removed. They often, however, occasion great risk to life, by the extent of surface affected, and by the disturbance of the functions performed by it, as in cases of universal bronchitis, where the changes produced by the air on the blood are impeded both by the disease, and by the morbid secretion produced by it. Inflammation may also extend from these surfaces to adjoining structures; the substance of vital organs, and even their serous envelopes, becoming extensively implicated, and the danger proportionately increased. — The *consecutive*, and particularly the *secondary, inflammations* described above (§ 112, 114.) are always most dangerous.

123. *B. The form and severity of the inflammation* necessarily influence the prognosis. — In general the *asthenic forms* are much more dangerous, other circumstances being the same, than the *sthenic*. Yet a very acute sthenic state of the disease, especially of internal viscera, may be as

rapidly fatal as any other, — the intensity of the morbid action soon exhausting vital power, and superinducing the more unfavourable consequences and terminations already described, especially copious effusion, suppuration, gangrene, &c. — The asthenic states of inflammation, even in external and non-vital parts, are seldom devoid of danger, unless they are early subjected to a most judicious treatment; for they generally originate in unfavourable circumstances: either the constitution of the patient is impaired, and the assimilating and excreting functions are weakened; or the causes which produced them are poisonous, contaminating, or infectious. Their diffusive or spreading character, generally arising out of these circumstances, increases the risk, not merely from the extent of the diseased state, that results, but also from the contamination of the circulating fluids that often takes place, and the consequent depression of the powers of life.

124. *C. The age, strength, previous health, diathesis,* and *habits of the patient,* are concerned, not only in favouring the production and the character of the inflammation, but also in modifying its course, consequences, and terminations.—Early age, strength of constitution, and previous good health, are generally favourable circumstances, in respect both of the form and result of the disease. Yet, in very robust and plethoric persons, accustomed to active exercise in the open air, and in the habit of drinking largely of malt or spirituous liquors, inflammation is apt to assume a most intense form, rapidly terminating in gangrene, effusion, or abscess. Inflammations of previously weakened or diseased organs, or of parts which have formerly been the seat of inflammation or congestion, and in the scrofulous, gouty, or rheumatic diathesis, are more or less unfavourable, particularly if affecting internal viscera; and, even in the mildest forms, are managed with great difficulty. — The habits and modes of life of the patient remarkably influence the prognosis. Persons who live temperately and abstemiously, and particularly those who partake of little animal food, and who abstain from stimulating beverages, are seldom subject to severe or dangerous inflammation On the other hand, persons who live grossly, who eat much animal food, and who drink much malt and spirituous liquors, experience the most severe and unfavourable forms of the disease, — especially if they are engaged in sedentary occupations, or take insufficient exercise.

125. *D.* It is obvious that inflammations are more unfavourable in *an advanced stage,* than when they come under treatment at an early period. But the degree of danger will depend chiefly upon the consequences to which they have already given rise, and to the seat and form of, and other circumstances connected with, the attack. The *extent* and exact *condition* of the local affection, and of the *effusion* which has taken place; the extent to which the functions of the affected organ are impeded; the commencement or presence of *suppuration,* or the imminent risk of *abscess;* the state, severity, and character of *the constitutional affection;* the degree of disorder manifested by the digestive, excreting, circulating, and nervous systems; and the state of the vital powers, — must all be taken into account, and an opinion formed conformably with the conditions they severally present: for, in proportion to the progress of the disease, and of any of its consequences, and to the amount of disorder manifested by the constitution generally, or by a vital organ in particular, will the risk of an unfavourable issue be great, especially if an internal viscus be the seat of inflammation. The degree in which the cause of the disease may operate during its continuance, should also influence an opinion as to the result; for it is obvious, that persistence of the causes will increase and prolong the effect, and render the consequences more unfavourable, than when the causes have been removed. (See arts. Abscess, Adhesions, Gangrene, and the articles on diseases of the individual tissues.)

126. VII. Theory or Nature of Inflammation. — The various states of inflammation cannot be satisfactorily considered without reference to the structure and vital relations of the arterial and capillary vessels; and, indeed, of the vascular system generally. — *A.* The *external* or *cellular coat* of arteries is more dense than common cellular tissue; and hence it rarely partakes of the serous infiltration of this tissue. It sometimes, however, is the seat of inflammatory exudations, particularly of coagulable lymph; and it occasionally contains a small quantity of pus, and more rarely of extravasated blood. It possesses the greatest degree of tenacity of any of the coats. — The *middle* or *fibrous* coat is highly elastic, particularly in the circular direction of the fibres, and consists of a substance in all respects resembling the elastic ligament of the spine. The fibres composing this tunic are connected by fine cellular tissue, but are easily separated by the pressure of a ligature. This coat is most developed in the large arterial trunks, and most subject to the impulse of the heart; it almost disappears in the smaller arteries, and entirely in the capillaries. The elastic power which it exerts, keeps up a continued pressure on the column of blood in the arteries; diminishing, however, with their size, until it nearly ceases in the capillaries. This elasticity accommodates the vessels to the quantity of blood passing through them, and facilitates the circulation by the pressure and reaction exerted on their contents. — The *internal* or *membranous coat* is highly polished on its internal surface; is transparent; and, although it resembles the finer serous membranes, it is more friable on pressure, and yet more elastic, than they.

127. In the finer arterial branches and capillary vessels, the fibrous or middle coat of the arteries disappears, so that these vessels seem to consist only of membranous canals, surrounded by cellular tissue. The muscularity and irritability of these vessels, although the subjects of so much discussion from the days of Vacca and Haller, are mere figments, which now deserve not the least notice. The muscularity does not exist, and the irritability is merely simulated by the changes consequent upon the application of agents which affect the organic nervous influence, and vital contractility of the tissues and capillaries.

128. The *nerves* which supply the arteries and capillaries are chiefly ganglial, or derived from the organic or sympathetic system. But filaments from adjacent parts of the cerebro-spinal nervous system communicate with them. Ganglial nerves have been traced around the arteries as far as the interior of the cranium, and the principal arteries

of the extremities, by WEBER and the author, in 1816 and 1817, and more recently by RIBES and others; and there can be no doubt that they extend even to the capillaries, endowing these vessels with influence, and with the properties evinced by them in health and disease.

129. The *vital states* which arteries and capillaries manifest, especially when influenced by stimulants, or depressants, are these: —1st. Of turgescence, dilatation, or enlargement; —2d. Of contraction or constriction; and, 3d. Of healthy or natural tone.—The first and second are anormal states, the third normal, and consistent with all the natural functions. It is to the *first* of these that attention is principally to be directed in discussing the nature of inflammation; but, before this state is considered, a very few remarks may be offered on the others particularised.

130. *a.* The *constriction* of arteries and capillaries arises chiefly from agents, which increase the vital contractility of tissues. Many of these agents are of very opposite natures, and yet they act, particularly in certain grades of activity, and periods of operation, in definite modes. Cold, fear, and other depressing passions, severe injuries, shocks to the system, &c., contract parts susceptible of organic contractility, especially the skin; arterial, capillary, and venous canals; cellular and serous tissues, &c. &c.: but, if the operation of these agents is intense, or long continued, the natural tone of the contractile tissues and vessels is impaired, and vital exhaustion or relaxation ensues. A similar constriction of these parts follows the application of astringents and refrigerants; the sudden diminution of the circulating fluids, as by hæmorrhage or venæsection; and the depression of vital power by whatever cause. The contraction of arteries and capillaries soon after death depends chiefly upon the weakened injection of blood into these vessels, just before dissolution, and to the entire cessation of the action of the left ventricle. The organic or vital contractility of arteries and capillaries is then no longer antagonised by the action of the ventricles upon the column of blood they contain, and is consequently allowed to advance to the utmost permitted by the fibrous and cellular coats; the arteries, and even the capillaries, being consequently found nearly empty and constricted after death. But as contractile parts lose their rigidity or tone with the incipient decomposition of the structures, the vessels afterwards relax, so as to allow a larger column of fluid to be injected through them than in the living state.

131. *b.* In the *healthy* or *natural tone* of contractile tissues, the arteries, capillaries, and even the veins, fully participate. Still this natural state of the vessels is liable to various deviations or deflexions, either to the side of turgescence, or to that of constriction, without amounting to what constitutes a truly morbid condition. Numerous causes produce either constriction or turgescence, without reaching the pitch truly injurious. It is chiefly when the action of the causes is intense or continued; or when they alter, by their primary and specific influence, the vital properties of the sentient system and contractile tissues; that the effect becomes truly morbid, and diseased action is set up. Much, however, depends, in such cases, upon constitutional disposition, or the degree and kind of susceptibility existing at the time of exposure to the causes. Agents which produce no derangement in some persons, violently affect others; and the same cause, which was without effect at one time, may be most injurious at another,—owing to varying states of organic nervous energy and susceptibility.

132. *c.* The *state of turgescence, dilatation,* or *enlargement* of the smaller arteries and capillaries, although a part of the inflammatory act, does not alone constitute it. Something more is necessary to its unequivocal production. This state may take place without being at all morbid,—as in the excitement of erectile parts, in the development of the uterus and mammæ during pregnancy, in the enlargement of collateral vessels after the obstruction of a large artery, in the act of blushing, and in the rapid growth or restoration of parts. It may even be morbid, or at least the source of disorder, without constituting inflammation. The active congestions and determinations of blood to particular organs, although often passing into inflammation, yet are very different from it. In these vascular disorders, more or less turgescence, or dilatation, of the smaller arteries and capillaries, as well as of the smaller veins, obviously exists; but still this state is not attended by the same phenomena, and does not give rise to the same consequences, as are observed in the various forms of inflammation. This state of turgescence of the capillaries of inflamed tissues has especially fixed the attention of modern pathologists; and the question, with them, has been almost limited to the inquiry, as to whether the increased diameter of the capillaries is to be imputed to relaxation or debility, or to augmented action. The least material point of the many, which should have fixed their attention, has thus alone engaged the whole of it; and, whilst they have attributed every thing to one or other of these two conditions, they have entirely overlooked the fact, that they are both contingent or consecutive changes; that either may exist according to the stage and form of the morbid action; and that the one as well as the other may be present quite independently of, and without, inflammatory action.

133. The *state of the capillary circulation* in inflammation has been agitated since the commencement of the present century, and even at the present day, with a parade of useless, deceptive, and ill-conducted inquiry, dignified with the name of experiment. Numerous cold-blooded and other reptiles, and often animals, very differently organised from the higher species, have been tortured for evidence, whereupon an argument might be hung in behalf of preconceived hypotheses; and crude and puerile observations have been made the basis of doctrines, which have failed of attracting notice, either from having been imperfectly understood, even by their propounders, or from having been overlaid by the multitude of words, in which attempts have been made to convey them. Thus the author of a recent work, entitled "A Critical and Experimental Essay on the Circulation of the Blood," &c., not only derives his inferences from imperfect observations, made at similar sources to the above, but also, because he observed an oscillating motion of the blood in the aorta of a frog after tying the vessel, jumps to the conclusion that, "it would appear almost certain that the arteries

possess a muscular contractile power;" although the previous inquiry, as to the existence of a muscular structure in the coats of these vessels, that some honest observers might, perhaps, have thought necessary, had never been entered upon by the author.

> "Such reasoning falls like an inverted cone,
> Wanting its proper base to stand upon."

134. Before entering upon a fuller explanation of my own views as to the theory of inflammation, and which are essentially the same as were published at first, more than twenty years ago, and at several times subsequently, the opinions of some writers most deserving notice may be adduced; although, as respects inflammation especially, a rational explanation of phenomena, as they are subject to our senses, is to be preferred to a mere collection of opinions — of hypotheses; in many of which, parts only of the truth appear — the rest being either kept entirely out of view, or hid under an accumulation of loose analogies and inconsequent argument, or buried in heaps of unmeaning verbiage.

135. i. Opinions as to the Nature of Inflammation. — *A.* Inflammation was very generally attributed to vitiated states of the fluids, until Van Helmont ascribed it to an irritation which attracted the blood in a greater quantity than natural into the capillary vessels, — the irritation arising from an affection of the *archæus* or vital principle. Willis, notwithstanding his espousal of the chemical doctrine of the blood, attributed more to the local irritation of Van Helmont, in the production of inflammation, than to the morbid condition of this fluid. Towards the close of the seventeenth century, several theories of inflammation, and of disease in general, were promulgated. The followers of Des Cartes imputed inflammatory action to a fermentation excited by the æthereal fluid which they supposed the blood to contain, and which Des Cartes substituted for the *gas*[*] of Van Helmont. The opinions of Sylvius were merely modifications of those of the two pathologists just named, and an accommodation of them to the chemical doctrines of the day — acidity of the fluids performing an important part in his theory. Le Mort, Schneller, (*Theoriæ Mechanicæ Delineatio*, 8vo. Leyd. 1705.) and others, adopted the mechanical parts of the doctrines of Des Cartes, and associated them with certain chemical hypotheses not much more deserving of notice. They imputed inflammation to irritation caused by the æthereal particles of the fluids without any reference to other changes. The partial rays of light, furnished by the rising of chemical science in Europe, were soon employed to explain morbid actions; but they led, especially at first, to little more than to modifications of the doctrines previously adopted, and particularly of the humoral pathology, and never disclosed results deserving of lasting attention.[†]

136. Pitcairn, the master of Boerhaave, first opposed the chemical pathology then very generally received; and applied the mathematical doctrines promulgated in Italy by Borelli, Sanctorius, and Bellini, and still more widely disseminated by the classical work of Donzellini (*De Usu Mathemat. in Arte Medica: in Guilielmini Opera.* 4to. Genev. 1719. t. ii. p. 516.), to the pathology of inflammation. To those acquainted with the physiological and pathological views of Des Cartes, the mathematical doctrines of the Italian physicians will appear as a very obvious and easy application of mathematics to the mechanical parts of the pathology, of which this philosopher may be said to have been the founder. Although numerous modifications of the theory of inflammation were proposed by writers of the mathematical school, yet they may be generally referred to an *error loci*, or to the obstruction which they supposed to be occasioned by the passage of the larger sized globules of the blood into a smaller series of capillaries, intervening between the arteries and veins[‡], than are destined to receive them.

137. Boerhaave proposed a theory, which, if it was not altogether original, was at least an important modification of that of Pitcairn, and of the mathematical school. He supposed that the blood itself became more viscid, causing a *lentor* in its circulation through the several orders of capillary vessels, and an excessive engorgement of them; an increased action of the larger vessels, and flow of blood in them, taking place to overcome the resistance and congestion. The close resemblance of this hypothesis to others much more recently proposed, is very obvious. That the action of the larger arteries should be increased, where an obstruction to the circulation through the capillaries exists, may readily be conceded; but that the afflux of blood can be increased, and obstruction at the same time exist, is a contradiction in terms. In one essential point connected with the theory of inflammation, Boerhaave differed altogether from Pitcairn. The former supposed that a constriction of the

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[*] Carbonic acid and hydrogenous gases were partially known to Van Helmont, and this imperfect knowledge of gaseous fluids became the basis of several of his pathological views.

[†] The Dutch physicians at the end of the seventeenth century were amongst the chief writers on Pathology, and consequently on Inflammation; and the schools of medicine in Holland were acquiring a reputation, which rose with the commercial prosperity of that country. But it is not altogether uninteresting to remark how many of the medical writers in it, about this time, adapted their pathological views, as well as their practical precepts, to the promotion of the traffic of the people. The foreign trade of Holland, rising upon the decay of that of Portugal, Spain, Venice, and Genoa, furnished numerous articles of luxury, not only to the Low Countries, but also to all Germany, and the East of Europe. Many of the medical writers of the country brought them into general use; and, whether they imputed inflammation and other diseases to inspissation, or to acidity, or to alcalinity, or even to effervesence, of the circulating fluids, still tea, tobacco, coffee, and opium, in extraordinary quantities, were not only the chief remedies, but also the principal prophylactics recommended by them.

[‡] The mathematical school boasts of a numerous list of names eminent not only in medical, but also in mathematical, science and in art — of Guilielmini, Michelotti, Bernouilli, Baglivi, Perrault, Chirac, Quesnay, Hales, Mead, Sauvages, and others; and furnishes many splendid examples of the dignity, as well as of the aid, which general science has imparted to the study and practice of medicine. The mathematical doctrine of inflammation was founded on the belief, that the globules of the blood consisted of various sizes, and that the red globule was formed of six serous globules, and each serous, of six lymphatic globules; three orders of capillary vessels, suited to the conveyance of these globules existing between the arteries and veins. The obstruction caused by the passage of red globules into the wrong order of vessels constituted what they termed an *error loci*, and the cause of inflammation. — Whilst the Cartesians insisted much on the various forms of the globules and pores, the mathematicians contended chiefly for the different sizes of the globules and capillaries.

capillaries caused a congestion of blood and slower rate of circulation, whilst the latter considered that an increased diameter of the vessels had this effect. The great defects in the opinions of these physicians, independently of their incorrect views as to the conformation of the capillaries, and as to the constitution of the blood and blood-globules, were their entirely leaving out of consideration the power exerted by the organic nervous or vital influence upon the vessels, and upon the circulation through them; and their being unaware of the fact, that both constricted and enlarged capillaries, or other vessels, may have the circulation through them either accelerated or retarded, according to the state of that influence by which the capillaries, and tissues in which they ramify, are actuated.

138. Whilst the mathematical theory of inflammation and disease was evidently supported by, if it did not originate in, the philosophy of NEWTON, and was the first manifestation of the comparatively modern doctrines of solidism, the views of HOFFMANN were more referrible to the system of LEIBNITZ, and a more complete adoption of the influence of the soft solids in the production of morbid actions. According to this celebrated pathologist, inflammation proceeds from spasm of the smaller vessels, which suspends or impedes the circulation in one part, and determines it inordinately to others, red blood being thereby propelled into capillaries, which in other circumstances admit only the serous portion of it; pain, swelling, and heat resulting therefrom. This theory soon found supporters; and, notwithstanding the already promulgated doctrines of his contemporary and colleague STAHL, these soon became numerous. Whilst the doctrines of STAHL and HOFFMANN were dividing the schools of Germany, and especially that of Halle, where they were taught by these celebrated professors, the opinions of the mathematical pathologists and of BOERHAAVE were predominant in this country and in Scotland, until the lectures and writings of the elder MONRO, of WHYTT, and of CULLEN, attracted notice.

139. The medical doctrines advanced in Germany at the close of the seventeenth, and at the commencement of the eighteenth, centuries, had more or less reference to the most generally received metaphysical views. The relations already noticed between the doctrines of inflammation hitherto adopted, and the pathology of DES CARTES, existed chiefly in respect of their more mechanical parts. But the psychological opinions of DES CARTES, and of his successor MALEBRANCHE, were not made the basis of a system of pathology until STAHL adopted them as such at a very early period of life. PERRAULT* had previously demonstrated the influence of mind upon all the bodily functions; but STAHL had reference to this influence in the production, not merely of inflammation, but also of all diseases, notwithstanding the objections of GASSENDI, urged against the physiology of DES CARTES, that the direct influence of the mind was limited to the brain and the organs of sense and volition.

140. The doctrines of STAHL and HOFFMANN continued for many years to divide medical opinion, notwithstanding the efforts of KAAUW BOERHAAVE in behalf of the views of his more celebrated uncle, and his endeavours to connect them with the system of HOFFMANN. In this country the opinions of HOFFMANN, according to the explanation and modifications of them attempted by CULLEN, became most generally adopted, particularly with reference to inflammatory diseases, although the able writings of WHYTT strictly belonged to the school of STAHL. Of all the successors of BOERHAAVE, GORTER most strenuously insisted upon the fact, that inflammation does not consist of congestion of the diseased part, but of an irritation affecting the vital condition of the vessels, and the circulation in them. The influence of irritants upon the state of vital action was, however, first contended for by GLISSON; but to GORTER and GAUBIUS belongs the credit of having more fully illustrated it, and developed the laws of excitement, thereby furnishing a basis for the doctrines of BROWN and DARWIN at a much more recent period.

141. Whilst the doctrines of BOERHAAVE, STAHL, and HOFFMANN were dividing medical opinion, and at a time when the views of HOFFMANN were gaining the ascendancy in their more general adoption, HALLER first published his opinions on *irritability*. He afterwards developed them more fully, and referred this property to the organisation of the muscular fibre, but was opposed by WHYTT, LORRY, and GAUBIUS, as to its precise source; and, contrary to the opinion of the former, who referred irritability to cerebro-spinal nervous influence, he carefully distinguished it from, and endeavoured to prove its independence of, this influence. He disputed the doctrine of this pathologist, that exaltation of irritability determines the circulating fluids to inflamed parts; yet there is no doubt, as WHYTT observes, that the "heat, redness, and inflammation, brought on the skin by blisters and sinapisms, are not owing to any increase of the force of the heart, or of the *momentum* of the blood in the larger vessels, — though this is often an effect of their application,—but merely to the action of these irritating substances on the cutaneous vessels, whereby the motion of the fluids in them is greatly augmented." HALLER believed that the accumulation of blood in the capillaries was owing chiefly to constriction of the small veins, and that the derivation of this fluid to any particular part should be attributed to the removal of the resistance furnished by the state of the capillaries and veins. He agreed with WHYTT, that obstruction cannot of itself produce inflammation; and insisted upon extravasation of the red particles, as constituting a part of the redness observed in some inflamed tissues. WINTER, nearly at the same time as HALLER, published views as to irritability, similar to those of this celebrated pathologist; and VERSCHUIR greatly extended, and at the same time modified, the doctrines of the latter, especially as to irritability of the arteries and capillaries in warm and cold-blooded animals. The

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* PERRAULT commenced his magnificent career as a physician, and soon acquired by his writings the first eminence as a physiologist, naturalist, painter, sculptor, mechanist, and architect; in which last character he is best known, especially as the architect of the beautiful façade of the Louvre. He translated and illustrated VITRUVIUS with splendid drawings and engravings; wrote an extensive work, in two folio volumes, on the Natural History of Animals; published numerous Essays on Physiology and Physics; and at his death left for publication a collection of recently invented and useful machines. All his writings abound in originality; for, in his very diversified studies, he was guided chiefly by observation and his own genius.

chief sources of error in the observations of those eminent writers are their having viewed the fibrous coat of the arteries as muscular; their imputing the properties of muscular tissues, not only to these vessels, but also to the capillaries, which are unprovided with this coat; and their confounding not only organic or insensible contractility and vital expansion, but also the elasticity of fibrous tissues, with the irritability or sensible contractility of muscular fibres. The intimate structure of parts, and the kind and degree of vital manifestation proper to each, were imperfectly known to them, and indeed to many of their successors, and were insufficiently distinguished one from another; and hence were confounded in such a manner as to vitiate most of their pathological inferences.

142. The chief modification in the theory of **Hoffmann**, suggested by **Cullen**, was his belief in a *phlogistic diathesis*, predisposing to, and occasioned by, local inflammation, — this diathesis consisting in an increased contractility of the fibres of the whole arterial system. He objected to the opinion of **Boerhaave**, as to congestion of the vessels being a part of the inflammatory state; and contended that the obstruction is owing to spasm, which indirectly causes an increased afflux of blood to the affected part. "A spasm," he remarks, "of the extreme arteries, supporting an increased action in the course of them, may therefore be considered as the proximate cause of inflammation, at least in all cases not arising from direct stimuli applied; and even in this case, the stimuli may be supposed to produce a spasm of the extreme vessels."

143. Some pathologists, towards the close of the last century, and in still more recent times, being unable to reconcile the idea of increased action with the enlargement of the capillaries, and the swelling constituting inflammation, believing, as they did, that increased action must necessarily be productive of contraction, had recourse to the supposition that the disease depended upon *relaxation and diminished action of the extreme vessels;* others, again, ascribed inflammation to *increased action of these vessels;* and thus pathologists were divided into two opposing parties. The chief fallacies, common to both, were, their having taken it for granted that capillary and arterial vessels possess a muscular structure performing the function of muscular parts; and that an increased action, according to the one party, and a diminished action, according to the other, constitutes the principal, and indeed the only, morbid condition throughout the disease. These opposite doctrines have been so warmly discussed in recent times, each party endeavouring to support their own views by experiments, that it becomes necessary to consider them somewhat in detail.

144. *B.* The *doctrine of relaxation*, or diminished action of the capillaries in inflammation, the blood becoming nearly stagnant in the dilated vessels, originated with **Vacca Berlinghieri** (*De Inflam. Morbosæ Naturâ, Causis, Effectibus, &c.* Flor. 1765.), and was promulgated in this country by Mr. **Allen**, who modified the opinion of **Vacca**, and contended that the action of the arteries is increased, a larger quantity of blood being thereby propelled into the weakened capillaries than they can transmit. According to this theory, the exciting causes, even when they stimulate the part, produce not an increased action of the capillaries, but only excite the larger arteries supplying the inflamed structures, and ultimately quicken the contractions of the heart. The effect of this is, that a larger quantity of blood than usual is propelled into the weakened capillaries, and especially the colourless branches; and upon this unusual quantity the weakened vessels are unable to react, so as to carry on the circulation — stagnation and obstruction in them being the result. Dr. **Wilson Philip** modified the doctrine of **Vacca** in a different manner; and, whilst he maintained that the extreme vessels are primarily weakened, he contended that the action of the larger arteries supplying these vessels is consecutively increased; the differences between active and passive inflammations depending, according to him, upon the degree in which the arteries supplying the blood to the inflamed part are excited. In further illustration of his views, by experiments and microscopic observation, Dr. **Philip** remarks, that "the motion of the blood is retarded in the capillaries, in consequence of the debility induced in them: an unusual obstacle is thus opposed to its motion in the arteries preceding them in the course of the circulation, which are thus excited to increased action." In this statement of his views, one difficulty presents itself: — How comes the debility of the capillaries, causing retardation of the motion of the blood through them, to follow directly upon the application of stimuli? Dr. **Philip** infers the debility from the apparent retardation of the circulation of the red globules in his microscopic experiments; and, having inferred the debility, concludes that the apparent stagnation must really exist. Thus reasoning in a circle, he states the above doctrine as its result. The difficulty here adverted to, seems not to have escaped Dr. **Hastings**, who appeared in support of the opinions of Dr. W. **Philip**. The experiments of Dr. J. **Thomson**, stated in his excellent work on Inflammation, had demonstrated certain points subversive of the doctrine of Dr. **Philip**, and of these Dr. **Hastings** took some notice. Inferring, with his master, or, more correctly, with **Vacca Berlinghieri**, that "inflammation consists of a weakened action of the capillaries, by which the equilibrium between the larger and smaller vessels is destroyed, and the latter become distended," he, nevertheless, is compelled to admit, that increased action or temporary excitement of the capillaries may precede the debility constituting inflammation. "Certain stimuli," he remarks, "applied to living parts, produce an increased velocity of the blood's motion, and a contraction of the vessels. During this state of excitement, the part affected is so far from having any thing like the appearance of inflammation, that the size of the vessels is diminished, and the part paler. But if the stimulus be long continued or increased in power, the small vessels, which, in the natural state, admit only of one series of globules, become so dilated as to allow an accumulation of a much less fluid and redder blood in them, which loses its globular appearance, and moves much more slowly than that which previously passed through the vessels. The part now appears inflamed. If the stimulus be removed, the blood-vessels do not soon regain their original state; time is necessary to allow them to recover their contractile power, so as to prevent the impetus with which the blood is propelled by the heart and larger arteries from keep-

ing up the dilated state of the capillaries." Dr. HASTINGS further contends, that, when acrid substances produce inflammation, debility of the capillaries takes place without previous excitement, the blood becoming very red, circulating very slowly, and stagnating in some of the branches. As Mr. MORGAN remarks, the hypothesis of weakened action of the capillaries, and slower motion of the blood in them, has been the most generally adopted of the recent theories of inflammation, because it admits of a more easy demonstration with the microscope.

145. All the supporters of this doctrine err, in attributing little or no share in the inflammatory act to direct excitement of the capillaries, — in believing that excitement must necessarily be attended by constriction of these vessels, and that dilatation of them is incompatible with increased vital action, — and in dismissing from their consideration the other morbid acts contributing to the production of the disease in its various stages and forms. That the extreme capillaries are weakened, dilated, and congested, and even that the blood stagnates in them at a more or less advanced period of sthenic inflammations, and at a very early period of the asthenic forms, have been stated above; but this condition is only one of several constituting the disease, which, in no instance and in no stage, depends upon a singleness of event, as contended for by the espousers of this and the opposite theory.

146. *C.* The *doctrine of increased action* of the vessels in an inflamed part may be attributed, as stated above (§ 140.), to GORTER and GAUBIUS, if not to GLISSON. They considered that inflammation was the consequence of *irritation*, which increases the vital action of the vessels, and propels the coloured blood into the colourless capillaries. Mr. J. HUNTER believed that inflammation is an increased action of the vessels of a part, attended by accelerated circulation; but he erred in supposing the vessels to be muscular, and the error vitiates more or less all his reasoning on the nature of the disease. Mr. MORGAN states that Mr. HUNTER's "opinion of the nature of inflammatory action is not clearly stated, nor does it appear from his writings that he had ever made any experiments in order to ascertain the state of the minute vessels." Mr. HUNTER, however, has stated his opinion of the nature of inflammation in several places, even in the same chapter, and to the purport just given. At another place he observes, "the very first act of the vessels, where the stimulus which excites inflammation is applied, is, I believe, exactly similar to a blush. It is simply an increase or distension beyond their natural size;" — and again, "whatever purpose the increase of the size of the vessels may answer, we must suppose that it allows a greater quantity of blood to pass through the inflamed part than in the natural state, which supposition is supported by many other observations." Indeed, the whole of the section, on the "*Action of the Vessels in Inflammation*," contains a very detailed and distinct account of his views as to the nature of the disease. As to the assertion, that Mr. HUNTER never made experiments to determine the nature of inflammation, the reader has only to refer to the section just mentioned, where he will find the details of observations and experiments made upon warm-blooded animals — not frogs, and other animals unsuited to the satisfactory elucidation of the subject — proving the justness of his views as respects certain states and stages of the disease.

147. The increased action of the capillaries in inflammation has been advocated by Dr. PARRY, partly by Dr. J. THOMSON, and by Mr. JAMES. Yet most of the same fallacies which vitiate the doctrine of the opposite party, may be urged against the majority of those who contend for the truth of this, and especially their belief in the irritability of these vessels. Indeed, this phrase has been employed by many, without attaching any precise meaning to it, and without being aware that, if by *increased action* they meant *increased contraction*, or even an increased power of alternate relaxation and contraction, as in muscular tissues, the circulation of the inflamed part would be altered by it very differently from what is actually observed. The circulation in health through the capillary vessels does not require the aid of any action on their part; for the contractions and dilatations of the heart, and the elasticity of the larger arteries, are quite sufficient for the transmission of the blood, not only in the capillaries, but also in the veins. Agents which change the tonicity of the tissues will necessarily affect that of the extreme vessels, and, consequently, the state of circulation through them; but such agents will seldom give rise to inflammation, unless by a succession of changes, of which alteration of the state of circulation, — whether increased or diminished, — is only a part, as I shall endeavour to show hereafter.

148. The experiments which have been planned and performed with a view of establishing the truth of either of these doctrines of inflammation, have been altogether vitiated by the circumstance of the chemical action — 1st, upon the tissues, — 2dly, upon the capillaries, — and 3dly, upon the blood, of the agents employed in these experiments, having been entirely overlooked. But this is not all; the physiological or vital action of these agents has been neglected, equally with the chemical action, and even with the changes they produce upon dead animal matter. These experiments abound, moreover, in other sources of fallacy, attributable to the means and aids used in ascertaining the effects, and to the subjects upon which they have been performed. Can it be believed that all these circumstances, — any one of which is sufficient to overturn the conclusions drawn from these experiments, — have been neglected? Instead of observing closely the changes taking place in tissues actually inflamed, and the succession of these changes in the different stages and forms of inflammation, as affecting different structures, substances producing both vital and chemical alterations in the tissues, blood-vessels, and blood itself, have been applied to parts, and the effects directly and remotely produced by them have been described as identical with inflammation, and made the basis of the prevailing doctrines of the disease. Before any inference, or even the smallest fraction of information, can be derived from the experiments paraded by many of the writers on this branch of pathology, it is necessary to bear in mind that acids, or alkalies, or alcohol, or turpentine, or neutral salts, when applied to a vascular tissue, produce effects which are not identical with any of the usual forms of inflammation. Acids affect the nervous influence of the part; constringe, corrugate, or cornufy the tissues and capil-

laries; change the colour and state of the blood in the extreme vessels, and arrest the circulation in them; and if inflammatory appearances supervene, much of the primary changes will still continue to modify its characters. Alkalies produce opposite effects; — they weaken the vital cohesion of the tissues, partially dissolve them and combine with them, redden and otherwise affect the blood, and, according to their strength, influence the form and termination of the morbid changes they produce in the part. Turpentine, and, in a less degree, alcohol, in their primary action, change the state of nervous power, constringe the capillaries and tissues, and retard the circulation in them; and neutral salts variously affect the vitality, the structure, the circulation, and the blood of a part, according to their individual constitution. When any one of the numerous substances which may produce inflammation is applied to a living tissue, the effects are not limited to the spot with which it is in actual contact. The impression extends, and a modified, or even opposite, action may be superinduced in surrounding parts. If the substance be injurious, or subversive of vital power in the part, more or less resistance is offered to the extension of the mischief. The injury affects the state of organic nervous power; and the irritation, or consequent reaction of this power, and its influence upon the surrounding vessels and blood, give rise to inflammatory action, either in the seat of injury or around it. If a living membranous tissue be pricked with a red-hot needle, the following effects will result; but these effects, although inflammatory in many respects, are not to be viewed as identical with idiopathic inflammation, as they have been by some writers, and for the reasons which will be stated. The red-hot needle will produce much pain, attended by the immediate constriction or corrugation of the tissues and capillaries; the blood being driven from the part immediately surrounding the puncture, the red globules undergoing a change in colour, and becoming stagnant in, and adhering to, the vessels adjoining the punctured spot. This is the immediate effect; but in a short time, — varying, however, with circumstances, — the punctured spot either becomes dark or black at a central point, around which the vessels dilate, the injury having either destroyed their continuity or obstructed them. The increased vascularity, which soon takes place around the injured spot, now becomes inflammatory, and is partly owing to obstruction in this spot, and to the consequent development of the surrounding capillaries, so as to carry on the circulation. But the affection, by the injury, of the organic nervous influence of the part, so influences the state of the extreme vessels, as to produce the chief of the phenomena. Now the early part of the changes here observed, are not to be viewed as identical with idiopathic inflammation, although illustrative of the production of inflammatory action by certain injuries; for the agent employed cornufies the capillaries, stagnates and changes the blood in them, obstructs their circulation, and severely affects the nervous influence; this last change especially producing, in the extreme vessels of the injured part, consecutive effects, which only are truly inflammatory, particularly in previously healthy constitutions or structures.

149. In order to arrive at any thing like a just notion of the nature of inflammation, the phenomena constituting it should be closely examined from the commencement, whether arising spontaneously, or produced by an irritant or excitant. But the phenomena observed in a single tissue, or in a particular form of the disease, are not to be viewed as constituting alone its characters in all stages, forms, and circumstances. The essential characters, as well as the subordinate phenomena, of inflammation, vary in all the states and stages of it; they are continually changing with their duration and the nature of the causes which produced them, and according to the temperament, habit of body, diathesis, and constitutional powers of the patient. So diversified do they thus become, that it would be endless, if not impossible, to describe them in all their conditions, periods, and consequences. The most prominent pathological states can only be mentioned; the descriptions already given, and the observation or experience of the reader, will supply deficiencies which must still remain, even after the most minute details.

150. ii. PATHOLOGY OF INFLAMMATION. — *A. Of the Nature of the Sthenic Forms.* — *a. The organic nervous tissue is primarily affected in the seat of inflammations of all kinds.* — I have already contended that inflammation, in its more *sthenic forms*, is a result of a *morbidly* excited state of the organic nervous tissue surrounding the extreme vessels or capillaries of the affected part, or a derangement from an unnaturally exalted condition of these nerves, on which the function of these vessels, and indeed of the whole vascular system, have been shown to depend. One of the chief inquiries concerning the nature* and pathological relations of inflammation is, whether this excited or exalted state of the organic nervous tissue is one of simple excitement or not, — whether the functions of the nervous tissue be merely increased above the healthy pitch, — or whether or not they are also otherwise changed. I have stated them to be morbidly or unnaturally excited, thereby indicating that they are increased differently from what we observe in a healthy part from the application of a stimulus, as respects both the *duration* and the *kind* of action they occasion.

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* The views which I now proceed to state, were published by me first, as already noticed, in 1815; on several occasions during the years 1821 and 1822, in the *Medical and Physical Journal*, and in the *London Medical Repository;* and still more fully in my *Appendix* to M. RICHERAND'S *Elements of Physiology*, published in 1824. They were the result of a close investigation of the subject; and if the reader will refer to the section on *Inflammation*, which I added to the last of the works just mentioned, and afterwards to that of KALTENBRUNNER, published in 1826, he will find my doctrine and observations fully confirmed by his researches, as well as by those of M. GENDRIN, also published in 1826. A very large reprint of my *Appendix*, containing the same section on *Inflammation*, without any alteration or addition, appeared in 1829. In 1835, and at still later periods, treatises and essays on Inflammation have been published by several writers, in which the principal parts of my doctrine have been adopted, but without any reference to the original propounder of them. Of this I thought it not worth while to take any notice at the time, as I was about having it in my power to do myself full justice, and to an extent, in respect of circulation, infinitely beyond what could be reached by the works in question. It is very probable that the opinions first brought forward by me have been subsequently suggested to these writers, without having ever perused any of my writings on the subject; yet one of the works only, and that one containing a full exposition of my doctrine, has been circulated to the extent of several thousands.

151. The *duration* of the healthy exalted action consequent upon simple excitement, mental or physical, is generally brief — the effects soon subsiding with the removal of the cause — because the nervous influence exerted on the capillaries is simply increased, without the mode or habitude of this influence being changed in kind. When, however, an irritant, stimulus, or other cause, operates upon a part so as to change the mode of organic nervous influence endowing it and its capillaries, the consequent vascular excitement or action is not only of longer duration, but is also altered in kind: it becomes truly morbid; and it either subsides gradually before the conservative powers of this influence as exerted throughout the frame, or undergoes a succession of changes, until it terminates in one or other of the ways described as usually observed in sthenic inflammations.

152. That the first change occasioned by the exciting cause takes place in the organic nervous influence of the part, is proved by the early effect produced by it upon the organic sensibility, and on the functions more immediately dependent upon this influence. The uneasy sensation of inflammation, in its various states and modes, is to be ascribed (§ 8.) to the morbid impression made on the organic or ganglial nervous tissue, and is to be viewed as the sensible expression of the consequent change in the condition of the influence exerted by this tissue in the affected part, — as indicating a morbid state of this portion of the nervous system, producing, and attended by, deranged action of the capillaries in the affected organ, and often exciting, or otherwise disturbing, the sensibility and functions of the cerebro-spinal nerves, with the terminations of which the former becomes associated in many of the textures. The pain or uneasy sensation attending the changes in the organic nervous tissue, which affect the state of the capillary circulation, so as to give rise to inflammation, is, as shown above (§ 82.), very distinct from the morbid sensibility often manifested by the cerebro-spinal ramifications, as in the different forms of neuralgia, and of spasmodic affection; and, although the latter is much more acute and violent than the former, yet it never gives rise to much vascular disorder. Excitement of the cerebro-spinal nerves has but little immediate influence upon the capillary circulation, excepting that of the countenance, as in the act of blushing; and then this is only temporary. Whatever influence these nerves may possess over the circulation, is only produced through the medium of the organic or ganglial nervous tissue distributed to the capillaries and structures generally. This provision is important as respects the preservation of the healthy functions of parts; for if the vascular system were *directly* under the dominion of the cerebro-spinal nervous system, all the functions of circulation, secretion, nutrition, &c., which are subjected to the organic nervous influence, would be liable to continual derangement from the various impulses of the will and the passions. — From this it will appear manifest, that changes in the cerebro-spinal nerves of an organ, or part, can have but little effect in the production of inflammation, whilst alterations of the organic nervous influence or sensibility are almost, if not altogether, necessary to its existence. In cases of severe injury to the spinal chord causing paraplegia, the lower extremities are not more liable to inflammation than in health.

153. *b. The causes being of an exciting nature, the primary effect on the organic nervous influence, and on the capillary circulation, will partly or chiefly consist of excitement, — the sthenic states of inflammation generally resulting.* — Whenever the causes of inflammation, either directly or indirectly, are of an exciting kind, — whenever excitement is even one only of the effects produced by them, — we must admit that the vital influence of the organic nervous tissue of the part upon which these causes act, will be increased for a time by them; the excitement being, however, modified by their nature. The organic nervous tissue, supplying the capillary vessels of the affected organ, will especially manifest this effect in the altered action of these vessels. Whenever the organic nervous influence is locally increased, the vital actions of the associated capillary vessels are also augmented — the diameter of these vessels becoming enlarged, and a larger column of blood circulating in them with increased velocity. This is evinced during excitation of secreting surfaces and of erectile parts, and by the enlargement of the nerves and blood-vessels of the uterus after impregnation. That the principal part of the more direct effects produced by the application of stimulants to living structures consists of exaltation or excitement of the organic nervous tissue, causing increased action of the vessels, is proved also by the phenomena observed to follow such applications to organs or parts supplied either chiefly or only by organic or ganglial nerves. Now, if we admit, what cannot be disproved, that excitement of the organic nervous influence of a part increases the vascular activity and circulation of that part, it must necessarily follow that, whenever an increase in degree forms a part of the change induced in this influence by the causes of inflammation, a proportionate augmentation of the size of the capillaries will take place — an active expansion, or turgescence, of the extreme vessels will result, and give rise to states of inflammation of a more or less sthenic character, according to concomitant circumstances, either extrinsic or intrinsic, in respect of the peson affected. But that the causes of sthenic inflammations do not merely excite the susceptible nervous tissue, and consequently vascular action, but also otherwise change the former, and consecutively the latter, is proved by the duration of the resulting effects, and by the succession of alterations, both local and general, as above described.

154. *c. In sthenic inflammations, organic nervous influence, and vascular action, are not only primarily increased, but also otherwise changed.* — In the early stage of all inflammations, there is every reason to suppose that the organic nervous influence of the capillaries and inflamed part is not merely changed in degree, but that it is also modified in kind; and that the differences existing, not only in the forms and varieties, but also in the stages, of inflammation, depend upon the extent and combination of these changes, — an excited, and at the same time a modified, kind of influence especially characterising the sthenic forms of this disease; the combination of impaired and altered influence with excited action constituting the more active states of the asthenic varieties. The irritant or other cause of inflammation

seems to impress the organic or vital influence, or the ganglial nervous tissue, of the part, or of the system more generally, in such a manner as to prevent this influence, and the vascular disorder produced by it, from returning to the natural state, at least for a considerable time. Morbidly excited action is thus induced in the capillaries of a part, particularly in the sthenic forms of the disease, and is succeeded by other changes. When the exciting cause alters the organic nervous influence in other modes, the capillaries are co-ordinately affected. If this influence is depressed as well as otherwise altered, locally or generally, either by the operation of the cause, or by pre-existing disorder, a state of action characterised by deficient power is the result. The specific forms which inflammation assumes when arising from certain causes, particularly from infection or inoculation, depends upon the mode or nature of the morbid impression made upon the organic nervous tissue of the part, especially that distributed upon, or interwoven with, the capillaries. The causes may act by their continued presence; thus irritating bodies, or the lesions of structure produced by chemical agents or by injury, may prove sources of irritation to the nerves and capillaries of a part; but more frequently the exciting causes change, by the impression made at first by them, the degree, mode, or state of influence exerted by the organic nervous tissue upon the capillaries and smaller vessels, and upon the fluid circulating in them; the resulting morbid action presenting corresponding and peculiar characters in respect of kind, degree, and power or tone. This is more remarkable in the more specific forms of inflammation, either produced by certain poisonous agents, or attending some constitutional maladies.

155. In experiments upon living tissues, the effects produced by various stimulants and astringents have in some respects been misinterpreted by the experimenters; and the slight constriction of the capillaries that directly follows the application of such substances, and before the dilatation which subsequently occurs, has been viewed as the first part of the inflammatory act. But this effect depends upon the action of these substances, particularly of turpentine, alcohol, the salts, and many others, upon the vital contractility of the tissues and extreme vessels. The instant effect of these is more or less constriction of the capillaries; but this very soon ceases, the natural state, or expansion beyond it, soon following. When the substance employed is of an irritating nature, without any astringent property, an enlargement of the capillaries is the next phenomenon to follow the impression made by it upon the organic nervous tissues; this impression being frequently rendered instantly and acutely sensible. In observations or experiments made upon the living tissues, care should be taken to distinguish between the effects produced, — 1st, upon the organic sensibility; — 2d, upon the organic contractility; — and, 3d, upon the physical properties of the tissues — upon their cohesion, elasticity, &c., or upon the properties which animal substances continue to manifest some time after death. The *first* of these ceases instantly with dissolution; — the *second* remains for a short time afterwards, but is soon exhausted by strong stimuli; — and the *third* continue much longer, but gradually disappear with the supervention of decomposition, yet admit of being more or less preserved and somewhat modified by various substances of an astringent and antiseptic nature. In the investigation of the nature of the changes in living structures, usually called inflammatory, the intimate relation existing between these changes, and the causes which induced them, should not be overlooked. The mode of operation of the causes, especially with reference to the vital and physical properties just enumerated, and to the local and general circulation, ought to be strictly regarded; and the manner in which the results may be modified by constitutional predisposition should be taken into account.

156. *d. The state of circulation in the early stages of sthenic inflammations.* — The primary affection of the organic nervous tissue having been shown to be one of *morbid excitement in the sthenic forms of inflammation*, and the effects of this excitement to be *turgescence, enlargement, or active expansion of the capillaries*, it next remains to inquire as to *the state of the circulation in the enlarged vessels.* This topic has been much discussed, for observations of the current of blood in the capillaries are liable to error; and besides, the flow of blood may be retarded at a single point, and greatly accelerated at others, particularly when inflammation is produced by mechanical or chemical agents. The state of circulation also undergoes a succession of changes, as will be hereafter shown, with the progress of the disease. It will not be denied that the organic or ganglial nervous tissue exerts a manifest influence, not only upon the capillary circulation, but also upon the blood itself; and that the secreting and other organic functions are under the dominion of this part of the nervous system. It consequently follows, that excitement, depression, or other affections of this influence, will produce co-ordinate changes, not only in the capillaries and related vessels of a part, but also in the state of circulation and in the blood in them. During excitement of the organic nervous functions of an organ, the vessels experience not only an expansion, but also an increase of tone — a vital turgescence. The capillaries, although increased in diameter, still retain the power of reacting insensibly upon the blood propelled into them, so as to preserve, if not to accelerate, the rapidity of the currents passing through them. The necessary result of these states is an increased flow of blood, and a rise of temperature, and these effects continue until the excitement is exhausted, — varying, however, in feature as well as in continuance, and more especially in the associated phenomena and consequences, with the mode or kind of excitement directly resulting from its cause.

157. When the propelling power of the heart and the tonicity of the larger arteries give rise to an increased *vis à tergo*, and particularly when the expansion of the extreme vessels is such as to allow a portion of their contents to escape through the delicate or imperfect canals in which they terminate, or when an obstacle is opposed to the return of the blood through the veins, a portion of the red particles escapes with the serum into the inflamed tissue, generally at minute or distinct points. This is observed especially when the tone of the capillaries in an inflamed part is exhausted, either by the nature of the exciting cause, or by

the previous excessive excitement, before the increased action of the heart has subsided.

158. *e. Of the development of new vessels in inflamed parts.* — It is not only the vital turgescence or expansion of the capillaries, so that those which could not admit the coloured globules of the blood in the healthy state readily admit them in an inflamed part, but also the developement of new vessels that is often observed. But this latter event takes place chiefly in serous membranes, and especially in albuminous exudations from the inflamed surface. It possibly may also occur in other parts, to a more limited extent, although it does not admit of so obvious a demonstration as in these. It can only occur in the various grades of sthenic inflammation, and it fully evinces that, although truly morbid in its nature, this form of the disease is characterised by vital activity, and by a deranged increase of the formative process in the affected part. In asthenic inflammations, however much capillary canals may be enlarged so as to admit a greater column of blood, no new vessels are developed, unless the asthenic be converted into the sthenic state. In the former state of disease, the expansion is the result of impaired vital tone and resistance, both of the capillaries and of the tissues affected; and the organic nervous power of the part, and the action of the capillaries upon their contents, are incapable of forming either coagulable lymph or new vessels. In the latter state, nervous power and vascular action are capable of producing the one, and often also the other.

159. When sthenic inflammation affects serous membranes, the morbid exudation thereby formed on their surfaces is sufficiently consistent to admit of the extension or growth of new vessels from those which had become enlarged in the early stages of the inflammatory act, and to give them support until they acquire considerable development. But when the asthenic disease implicates these membranes, the secretion from their surfaces is too watery or serous to furnish consistent canals or channels in which the contents of the capillaries may be conveyed beyond those which are morbidly enlarged, without commingling with the rest of the effused matter. In cases where new vessels form, the exuded lymph or albumen, into which they run, is not only to a certain extent consistent, but also somewhat scanty, or at least not very abundant; but in cases where they cannot be formed, the fluid effused is generally both serous and copious.

160. The production of new vessels in parts sthenically inflamed, particularly in exudations of lymph, is observed chiefly in young persons, and especially in these who are in the course of development. Occasionally the new vessels are numerous and distinct, even before the lymph had become at all abundant or consistent. In some very beautiful injected preparations by Mr. KIERNAN, the eminent pathologist, that he kindly showed me, this was most remarkably demonstrated; as well as the fact, which has been controverted by some French pathologists, that the new vessels shoot out from the inflamed surface, if not from those enlarged in the early stage of the inflammatory act. When new vessels form in the fibrinous lymph exuded from serous membranes, they may often be injected,—the continuity of these vessels with those of the affected part being thereby clearly shown. Yet the most vascular part of the newly organised false membrane may not be that nearest the seat of inflammation,—the new vessels forming several anastomoses, and occasionally becoming enlarged in some places at a distance from the surface whence they were produced.

161. *f. Consecutive changes in the sthenic forms.* — The successive changes taking place in the course of sthenic inflammations are conformable with the laws of the animal economy. The excitement produced in the organic nervous tissue and capillaries of the part is exhausted with a rapidity, and to an extent, in proportion to its intensity relatively to the powers of the constitution, and of the part affected; and as the exhaustion proceeds, the tonicity of the extreme vessels and of the diseased tissue, as well as the vital cohesion of both, is weakened, the circulation through them retarded, and the colour of the blood deepened. The extent to which these changes take place, in connection with the degree of general vascular action, and of constitutional power, fully accounts for the lesions consequent upon sthenic inflammations. When phlegmasia arises from specific causes, the kind of morbid excitement primarily induced by them will, according to their nature, more or less modify these changes, and give rise to certain results in preference to others. We perceive this in the exanthemata and in various inflammatory diseases. The tissue affected will also modify the continuance and mode, as well as the consequences, of the morbid excitement. But there can be no doubt that the successive alterations in the inflamed structures are merely consequences of the morbid impressions made by the exciting causes upon the organic nervous tissue, particularly in its connection with the capillaries; the states of these and the connected vessels, of the circulation through them, of the blood, and of the diseased part, being the effects which may either disappear before the vital resistance of the frame, or terminate in any of the ways described above (§ 39, *et seq.*).

162. *B. Of the Nature of the Asthenic States.* — The remarks which I have just offered more especially refer to the *nature of the more sthenic inflammations*, and it is, therefore, necessary to consider *the circumstances in which the asthenic states differ from these.* It has been shown that these states proceed chiefly from constitutional predisposition, or from previous or associated disorder, or from the nature of the exciting cause. In either case, the organic nervous influence, and, consequently, the tone or vital contractility of the tissues and capillaries in the seat of the disease, are quickly exhausted or readily depressed, and soon become otherwise morbidly affected,—effusion, softening, disorganisation, or gangrene, taking place with a rapidity in proportion to the primary vital depression, or to consequent exhaustion, and to the nature of the impression made by the exciting cause. In cases of asthenic inflammation, either there has been originally, or acquired, great debility or deficiency of the organic nervous power, or the assimilating and excreting functions have been long disordered and imperfectly performed, or the exciting cause has been of a powerfully depressing or poisonous nature. Indeed, two, or even all, of these circumstances may be concerned, each more or less, in the production of some one or other of the morbid states of action comprised under the

more generic appellation, asthenic inflammation. Owing to one or more of these circumstances, the vital contractility of the capillaries and tissues of the affected part is impaired; vital cohesion is weakened, so as to occasion remarkable softening and friability of the structures; the tone of the extreme vessels is so far lessened as to admit the effusion, and percolation through the more yielding tissues, of the more serous portions of their contents, sometimes coloured by red particles; the vital resistance of the capillaries, owing to the loss of tone, is insufficient either to resist even the weakened impetus of the blood, or to react upon it so as to carry on the circulation through them and the venous capillaries; and, ultimately, increased effusion, retardation or stagnation of the blood in the minute vessels, and all the consequences shown to result from the asthenic forms of inflammation (§ 70, *et seq.*), take place. Throughout the course of asthenic inflammations, the states of organic nervous influence, of vital action in the extreme vessels, and of the circulation in the affected part, are incompatible with the production of coagulable lymph; and hence the effused fluid infiltrates the more soft surrounding tissues, and, owing to its morbid condition, caused by the states of vital action and of the blood, contaminates them, or promotes their disorganisation.

163. The *distension* of the capillaries in asthenic inflammations is referable to impaired or lost tone, rather than to an active vital expansion or turgescence similar to that which characterises the early stages of sthenic inflammations; or, if the latter state exist at first, as it probably does for a very short time, in the less asthenic cases, it soon exhausts itself, and passes into atonic distension, with retarded circulation. But there is every reason to infer, that the current of the blood is impeded or retarded in the capillaries at an early stage, or even from the commencement, of many cases of asthenic inflammation, particularly those caused by septic agents or animal poisons; and that the blood soon becomes stagnant in them, the various consequences, already noticed, appearing according to the intensity and rapidity of the previous changes upon which this has been shown to depend. In proportion, generally, as the circulation is retarded in the extreme vessels, the temperature of the inflamed part sinks, and the colour becomes deep or livid, until a purplish or brown hue is acquired. As soon as these changes take place, disorganisation soon follows, and proceeds with a rapidity in proportion to the weakness of vital power and resistance. If the organic nervous energy be aroused or reinforced by appropriate constitutional and local means, the mischief may be arrested, unless it have already proceeded beyond the powers of restoration, and it may be ultimately remedied, as in the advanced stages of sthenic inflammations. When the asthenic forms are arrested at an advanced stage, they generally assume more or less of the characters of the sthenic condition, reparation taking place as in that form of the disease.

164. *C. Of the Intermediate States of Vascular Action and Vital Power in Inflamed Parts.* — As shown in the article DISEASE (§ 87, *et seq.*), the states of organic nervous influence and vascular action do not always present specific grades or forms, which certain terms can precisely represent. The terms applied to morbid action are entirely relative; and whilst we use the appellations *sthenic* and *asthenic*, to convey an idea of the more extreme and opposite states of nervous power, and of vascular action, we must not overlook that every intermediate form and grade may exist between them. To describe states, so diversified as these are, is obviously impossible. All that can be attempted is to notice certain circumstances generally appertaining to them. — The organic nervous power, evinced by certain inflammations, may not materially vary in *kind* from the natural standard or condition, and yet vascular action may be excessive and very acute, or much more moderate, and, consequently, more protracted, or slight, and more or less chronic. The forms of inflammation, particularly as respects the acute, chronic, and intermediate or sub-acute states, result chiefly from the grades of organic nervous excitement and vascular action; whilst the more specific characters which they present depend principally upon the conditions of the organic nervous energy, as regards not only the *amount* of the excitement or depression, but especially the alterations or *deflections in kind* from the natural habitudes of this energy. Whilst the *activity* of the inflammation depends chiefly upon the grade of vascular action in the inflamed part, in connection with the degree of general vascular commotion, the *specific character* of inflammation arises principally from the truly diseased impression made upon the organic nervous tissue of the part, and from the change thereby effected in the influence of this tissue on the vascular system, such change being in the kind, rather than in the degree, of organic nervous influence.

165. The varieties of ERYSIPELAS, the local inflammations attending the different *exanthemata*, and, indeed, the numerous specific forms of inflammatory action induced by these and other infections or animal poisons, are illustrations of alterations in the *kind* or *mode*, rather than in the *degree*, of local and general organic nervous energy and vascular action. In these, and in all the asthenic states of inflammation, there is a much more remarkable alteration in kind from the natural standard than in the sthenic forms. The *intermediate states* between the most fully expressed sthenic and asthenic conditions depend chiefly upon specific or other deviations in kind — *upon the truly morbid changes* now contended for, especially such as immediately proceed from the nature of the exciting causes, or from contagion. The principal of these, owing to their specific form, are fully discussed under appropriate heads.

166. *D. Of the Existence of different States of Capillary Tone and Circulation in the same Inflamed Part and the Vicinity.* — Much of the discussion which has taken place as to the capillary circulation in inflamed parts has been owing to the variations in this state during the course of the disease, and to the different vital conditions of the capillaries and of the small arteries, in different parts, or in the several tissues comprised in the seat of inflammation. — When compound or parenchymatous structures are inflamed, such differences or variations are the most remarkable, particularly if the disease has commenced at a single point. At this point, especially, the tone of the capillaries becomes the soonest exhausted, and the current of the blood retarded; and these states increase the vital turgescence of the surrounding

vessels, and accelerate the circulation through them. When the substance of an organ is inflamed, the fibrinous lymph exuded at the point first affected, often retards, by its pressure, the circulation in the vessels at this point; and owing to this obstruction, the surrounding vessels are the more readily developed, and more prone to become morbidly turgescent. The lymph effused also affects the vitality of the part, either occasioning more or less irritation to the organic nervous tissue, or perpetuating or modifying the disorder of this tissue already existing, that caused its effusion. Müller thinks that the lymph coagulates in the extreme capillaries, when the inflammation is seated in the substance of an organ; but I believe that it is exuded in the areolæ of the structure, thereby rendering the part more solid or dense; the change thus produced having been termed condensation, solidification, hepatisation, or splenification, according to the appearances assumed, and to the organ affected. It is only in the sthenic forms of inflammation that the effused fluid gives rise to these changes, as shown above.

167. If the intensity of the morbid action in the spot first affected be so great as to exhaust its organic nervous power or its vitality, and to retard its circulation, or to stagnate the blood in the capillaries, not only do the surrounding vessels become more turgescent and developed, but the blood which has thus stagnated, and the tissue itself, undergo very material changes, as described above (§ .). Hence very opposite states of the circulation generally exist in different parts of the seat of inflammation, especially when the disease is advanced. In cases of injury, particularly of laceration, pressure, or other changes, the capillary circulation is often directly obstructed; and either independently of lesion of the organic nervous tissue and sensibility, or aided by such lesion, diseased vascular turgescence is thereby developed around the seat of injury,—the capillaries thus obstructed, and the blood contained in them, soon undergoing changes productive of suppuration, or ulceration, or gangrene, whilst sthenic vascular action is either proceeding in the surrounding turgescent vessels, or passing into exhaustion or into the asthenic condition, progressively from the point of injury, or from the spot first affected, according as the constitutional powers may resist, or may favour, the extension of the mischief.

168. *E. Of the State of the Venous Circulation in Inflamed Parts.*—There is every reason to believe that the venous circulation is locally more than usually active in the sthenic and acute forms of inflammation; but that it is more or less languid in the asthenic varieties. When the former, also, goes on to suppuration, and especially to ulceration, the circulation in the veins, more immediately proceeding from the part, is generally somewhat retarded, the retardation increasing these changes. Hence the importance of favouring the return of blood from the part by position, when these consequences of inflammation have taken place. Whenever the venous circulation is obstructed, effusion and œdema increase rapidly in the part affected, and in its vicinity; and the consequent retardation or stagnation of the blood in the capillaries, induces or accelerates disorganisation. This is observed very frequently in erysipelas, and constantly when the inflammatory action extends to the veins — which not infrequently occurs when the constitutional powers are depressed, or in the more asthenic forms of the disease. In such cases the local lesions are remarkably increased, not only by the stasis of blood in the capillaries, but also by the more copious morbid effusion caused by the obstructed return of blood.

169. *F. Of the Function of Absorption in the Seat of Inflammation.*—In the early stages of sthenic inflammation especially, absorption seems to be less than usually active; but, when the disease proceeds to ulceration, or even to suppuration, and when it assumes asthenic forms, then the absorbent action is often increased, although there are numerous exceptions to this, absorption sometimes being manifestly impaired. When the absorbents become inflamed, owing to the morbid nature of the cause, or of the matter formed in the primary seat of disease, then more or less of obstruction results, and the function is arrested, great tumefaction of the parts beyond the obstruction taking place, and increasing the local mischief by pressure and by the contaminating influence of the morbid secretion. In obstructed venous circulation the swelling increases rapidly, chiefly from augmented effusion; in impeded absorption it advances with nearly equal rapidity, from the fluid being undiminished by removal. In either case the effused fluid undergoes material changes during its retention, and becomes more and more hurtful to the tissues containing it, and more irritating to the vessels which may absorb it.

170. It was supposed by John Hunter and others, that *ulceration* depends upon increased activity of the absorbents of the part, when inflammation has reached a certain period of its progress. But I believe that it is chiefly owing to the superficial softening or loss of the vital cohesion at that part of the inflamed tissue where the extreme vessels have lost their functions, and to the solution of the molecules of the tissues in the fluid effused from the diseased surface (§ 48.). Absorption is probably also concerned in the process, and in various degrees, according to the seat of the inflammation, and the states of organic nervous or constitutional power and of vascular action.

171. *G. Of the States of the Blood in the Capillaries of Inflamed Parts.*—The blood circulating in inflamed parts presents very different appearances with the form and stage of the disease. In the sthenic forms, and particularly in the early stages, before any of the more unfavourable consequences have supervened, the blood is florid, and partakes much of the characters of arterial blood; but in the asthenic forms, and less remarkably in the advanced stages of the sthenic, it is more venous, or of a darker hue. It is sometimes quite purplish, or blackish, particularly when a tendency to sphacelation or gangrene occurs. Also, as it circulates in the capillaries, the globules seem, under the microscope, gradually to move more slowly, and to be attracted by the sides of the vessel, or to stagnate in the capillary canals. This change seems to commence in the smaller or capillary veins, and to extend, especially in the asthenic states of inflammation, in the direction of the minute arteries, the temperature sinking with the deepening of the hue, and with the loss of motion of the blood-globules. In other respects the

blood presents the appearances already described with reference to the different forms of inflammation. (See § 25. 66.)

172. iii. Of Reparation of the Consequences of Inflammation. — Reparation of the effects of inflammation is accomplished only under the influence of life, although much assisted by art. It may be very briefly considered, with reference, 1st, to the removal of those changes more immediately resulting from inflammation that are independent of loss of substance; and, 2d, to the restoration of disorganised or of lost parts, where either has taken place. Whether morbid depositions are to be removed, or losses of substance are to be supplied, restoration of the manifestations of life in the various organs to their healthy states is the chief intention to be fulfilled. Frequently nothing more than the subsidence of the morbid action in the affected part is necessary to the reparation of the injury done; but often something more is requisite, and the aids of science are needed to assist in the work of restoration.

173. *a.* The *softening*, or impaired vital cohesion of the inflamed part, the *fluids effused* in the areolæ of the tissue, and the coagulated lymph thrown out upon a serous surface, or poured into the porous structure of an organ, so as to solidify it, will generally be removed, when the morbid action which caused these changes has altogether subsided. With the return of the functions of the part, the vital cohesion will be restored, and the activity of absorption will gradually remove the fluids effused in the substance, or upon the surface, of an organ. If the lymph have become partially organised, or have formed false membranes on serous tissues, or have agglutinated the opposing surfaces of shut cavities, the difficulty of removal will be increased, and the time of effecting it prolonged But if the inflammatory action be entirely subdued, the object will be ultimately attained, and with a rapidity and certainty in proportion to the restoration of the powers of life throughout the frame. Even when the coagulated albumen is organised into false membranes, or into cellular adhesions, their extent and their vascularity will gradually diminish, and they will either entirely and slowly disappear, or become merely lax bands, or thin films, offering little or no impediment to the functions of the parts which they connect. Yet, where such adhesions form, a disposition to returning inflammation will generally exist, or the morbid action which produced them will continue in a much slighter and chronic state. It is chiefly to these circumstances that most of the unfavourable results consequent upon adhesions are owing. The lymph effused in the areolæ of a parenchymatous viscus, as in hepatisation or splenification of the lungs in pneumonia, is commonly soon removed with the subsidence of the disease, and much more rapidly and certainly than the lymph poured out upon a serous surface. The albuminous exudations sometimes formed on mucous membranes very rarely or never become organised, but are detached and thrown off as the diseased action subsides, by an increased secretion of mucus from the follicles underneath. In the course, however, of their excretion from the canals which those membranes cover, they often occasion remarkable disturbance, severe spasms, or even death by asphyxia, especially when they form on the respiratory surfaces, as in *croup*, *laryngitis*, &c.

174. *b.* When the organic nervous and vital powers continue but little impaired, serous and albuminous fluids effused during inflammation are generally removed upon the subsidence of diseased action, although the rapidity and completeness of removal will depend much upon the nature, consistence, and extent of the effusion, and the states of constitutional energy. If the fluid is truly purulent, and especially if it form an encysted or circumscribed *abscess*, restoration is then generally difficult, and only to be accomplished, particularly when the collection is deep-seated, either by absorption, or by the extension of the abscess to an external or internal surface, as is fully shown in the art. Abscess (§ 30.). When the fluid of an abscess is absorbed, nothing but a firm cicatrix, generally linear, or irregular and circumscribed, is observed in its former seat. But when it finds its way to a surface and is evacuated, either the patient sinks under the local lesion and discharge, and the constitutional disturbance, or the work of reparation proceeds under the influence of the vital energies. In this latter case, the discharge from the surface of the abscess becomes albuminous, the parietes contract, and the cavity diminishes. Instead of pus, an albumino-puriform fluid is secreted, which gradually becomes more and more albuminous and scanty. The fluid exuded upon the internal surface of the abscess at last passes into the state of coagulable lymph, under the restoring influence of the organic nervous energy; it becomes vascular, and healthy granulations thus form, and fill up the cavity which the contraction of its parietes is incapable of obliterating; and thus the injury and loss of substance are repaired.

175. In the reparation of *ulcerated* parts a similar process takes place. The softening and solution of the molecules of the tissues in the fluid discharged from the ulcerated part are first arrested by restoring organic nervous energy, by local or constitutional means, or by both. Thereby a more healthy secretion takes place, and suppuration is established, and is followed by granulation in the manner just described, the mischief being thus repaired. Ulceration is most prone to occur, and to proceed rapidly, in parts exposed directly or indirectly to the air, or to the contact of irritating matters; and in those which are most distant from the centre of the circulation, and in which the capillary circulation is naturally weak or slow. Hence it is of importance to the reparation of an ulcerated part, to protect it from those sources of irritation. When an ulcerated surface is extensive, and the tone of its vessels much impaired, the discharge is generally so copious as to detach from it all applications calculated to protect it from irritation, and is so injurious or contaminating as to increase the mischief, if allowed to remain any time in contact with it. The first object in such cases is to restore the organic nervous energy, and tonicity of the capillaries of the part, and thereby to diminish the quantity, and to improve the quality, of the discharge. The fluid subsequently exuded on the diseased surface will often of itself serve as a protection; and applications which restore the tone of the extreme vessels, and diminish or coagulate the discharge, whilst they further protect

the part, will then be of service, complete reparation taking place under the eschars or scabs, sometimes thus formed. In this manner, strong solutions of the nitrate of silver, or other stimulating and astringent substances, often act very beneficially on ulcerated surfaces, whether the discharge coagulate on them or not. But this subject will be more appropriately considered hereafter.

176. *c.* In cases of *divided* or *injured parts,* when the blood, or the fibrinous lymph exuded from the capillaries, coagulates so as to protect them entirely from the air, and without allowing coagula or any other substance to remain that may occasion irritation, the healing process often proceeds without any evidence of phlegmasia taking place. When divided parts are brought in contact, after the hæmorrhage from them has ceased, the lymph exuded from the opposing surfaces will first slightly agglutinate, and afterwards perfectly connect them, small capillary vessels penetrating and organising the connecting medium, which will diminish more and more as it becomes firmly organised. In this process, which has been called by surgeons, "*union by the first intention,*" inflammatory action can hardly be said to exist. If it actually take place, very different phenomena present themselves. This process has, however, been described as a consequence of phlegmasia, — probably owing to the circumstance of inflammation actually taking place in some parts or other of the surfaces, the union of which is thus attempted, and which various causes prevent from uniting, and chiefly by exciting inflammation in them. It is very rare that divided surfaces entirely unite without this disease being excited in some portion or other; for incongruous parts or tissues are often brought together, that are incapable of uniting directly. These must necessarily become inflamed, and give rise to the usual consequences of phlegmasia. Moreover the fluids and blood effused from the divided structures, and the ligatures placed upon the larger vessels, are sources of irritation, seldom failing of producing inflammatory action, although the more congruous tissues may have perfectly united. In all such cases, union has taken place in the uninflamed parts only. (See the *Local Treatment of* INFLAMMATION.)

177. VIII. TREATMENT. — The treatment of inflammation must necessarily be guided by a variety of circumstances and considerations. The chief of these refer, — 1st, to the disease itself; 2d, to the individual affected; and, 3d, to the nature of the exciting causes. — *a.* The character, form, progress, and consequences of the inflammation, existing at the time of treatment, should be carefully weighed, as these severally require very different, or even opposite, indications and means. — *b.* The age, strength, temperament, diathesis, habit of body, modes of living and occupations of the patient, ought also to be taken into consideration, and the treatment modified accordingly. — *c.* The exciting causes, the states of constitutional predisposition, and the predominating influences to which the patient is subjected, should be ascertained as fully as possible, and the means of cure selected with strict reference to them. — As the form and character of the inflammation depend chiefly upon the circumstances here alluded to, I shall discuss the treatment which observation has shown me to be most appropriate and successful in each of the principal forms under which I have described this important class of diseases.

178. i. TREATMENT OF STHENIC INFLAMMATIONS. — *A. Acute Phlegmasia.* — *a. At an early stage* of all sthenic inflammations, the *indications of cure* are — 1st, to lower general and local vascular action; 2d, to equalise the circulation, and to derive from the seat of disease. Several of the means which are employed to fulfil the *first,* also often accomplish the *second* indication.

179. (*a*) *In order to lower general and local action,* numerous agents are usually prescribed according to the peculiarities of the case. These operate either upon the system in general, and indirectly upon the part affected, or immediately upon the latter, and consecutively upon the former, according to their natures, and the manner of employing them. — *a.* Of those which act in the first of these modes, *bloodletting* is one of the most important. It has been, however, very much abused; and the cure of inflammations has too generally been attempted by it chiefly, or even alone. There are numerous circumstances which either very remarkably limit, or entirely contra-indicate, the employment of bloodletting, in those morbid conditions in general, which have been all denominated inflammation, although differing greatly from each other; and even in this, the least equivocal form of the disease, there are many considerations which should weigh with the practitioner in limiting the amount of the depletion on the one hand, or in inducing him to carry it far on the other. The extent to which it may be prescribed should be determined by the age, strength, temperament, diathesis, and habit of body of the patient; — by the constitutional symptoms; — by the vital importance and structure of the part affected; — by the duration of the inflammation; — by the states of the pulse and of the blood first drawn; — by the effects produced by a former depletion; — and by the condition of the tongue, skin, and urine.

180. If the patient be young and robust, and well nourished — if the disease be very acute, or seated in a vital organ, or serous surface — and if the constitutional affection be of a manifestly sthenic kind, — the quantity of blood taken at first should be very considerable, and it ought to be taken in such a manner as to make a decided impression upon the circulating system as soon as possible — or in a large and full stream, so that the rapidity of the abstraction may assist the quantity in the effects produced upon the disease. As I have recommended in the article BLOOD (§ 64.), the depletion should be effected whilst the patient is in a semi-erect or semi-recumbent posture, in order that the desired approach to syncope may be more certainly produced, without, however, causing syncope, for the reasons fully explained in the article just referred to. — The first abstraction of blood ought to be instantly followed by the means about to be noticed (§ 196.); but the circumstances now stated as demanding a full or large depletion in the first instance, will require a repetition of it, generally to a less amount, but in strict reference to the local and constitutional symptoms, to the effects produced, to the time which has elapsed from the first

bloodletting, and to the appearance of the blood then taken away.

181. The *pulse*, the *blood*, and the character of the *pain* in inflammations, furnish many useful indications as to the *institution*, the *repetition*, and the *amount* of *depletion;* but they may mislead most remarkably, if the numerous exceptions they afford, and the circumstances in which these exceptions occur, be not taken into account. — In inflammations of vital organs, and particularly of the stomach, of the intestines, or of the substance of the brain or liver, the very intensity of the disease may produce so severe an effect upon the constitution, — so violent a shock to the vital powers,—as to deprive the *pulse* of firmness or tone, and to cause not only an oppressed, but also a weak, small, slow, or an irregular, state of pulse. In such cases the practitioner must not be deterred from bloodletting by this circumstance; for after a few ounces of blood are abstracted, the pulse will become more full, strong, and regular. In all inflammations, especially of vital parts, depletions should be performed with a most attentive regard to the phenomena whilst the blood is flowing; and in cases similar to those alluded to, the effects ought to be most assiduously watched. If the pulse rise in strength, and especially if it become hard, as well as developed or full, the bloodletting may even at first be carried so far, as to make an impression upon the circulation, and to reduce the pulse again in strength and fulness. —When the pulse is open and throbbing, or jerking, as generally observed after copious hæmorrhages, bloodletting will rarely be of benefit, although it has not been already resorted to, and it may be most injurious. Where a moderate bloodletting produces sinking or syncope, without affording relief, it will be injurious to pursue the practice further, if, indeed, it has not already been prejudicial.

182. A hard, tense, or strong pulse, not only requires a very copious depletion at first, but generally also a repetition of it. If a pulse, which was too frequent and too full, is reduced in these respects — or if a hard, constricted, or small pulse is softer and freer — or if a pulse hitherto slow and oppressed has become more natural, — it may be concluded that the bleeding has been of service, and that it may be safely repeated to a less amount, if the symptoms require it. If, on the contrary, the pulse has become weak, hurried, compressible, open, jerking, irregular, or intermittent, without producing relief, the bleeding has already proved injurious, and a repetition of it would be productive of danger. It may be taken as a general rule, that when the pulse is above 110 and compressible, whatever may be the organ inflamed, the system will not bear general bloodletting even in the first instance. The local abstraction of blood, however, with caution, may prove of service.

183. The *appearances of the blood* first abstracted have generally influenced the physician more or less in prescribing a repetition of depletion. But they ought to be considered in strict connection with the other symptoms. The appearances most deserving of notice are — the firmness or looseness of the crassamentum; the proportion it bears to the quantity of the serum; and the presence or absence of buffiness, and cupping of its surface. In the article BLOOD (§ 96, 97.), and in a previous section (§ 25.), I have fully discussed the appearances of the blood indicative of sthenic inflammations. These should receive attention in practice; but I may here remark, that although a cupped and buffed state of the crassamentum is evidence of an excited state of the circulation, and very frequently attends inflammation, yet alone, or without the presence of other symptoms indicating the propriety of bloodletting, it is no proof that this measure has been indicated, or that its repetition is requisite. When, however, the crassamentum is large, firm, or dense, and the buffy coat is considerable, thick, firm, and tenacious, the other signs of inflammation being present, depletion may be repeated, and occasionally oftener than once. If the clot be loose, has a thin or an irregular edge, and especially if it be small relatively to the quantity of the serum, a repetition of depletion will be injurious. In all cases the appearance of the blood depends much upon the manner in which it is taken, — especially upon the size of the orifice, the posture of the patient whilst the blood flows, and the shape and size of the vessel in which it is received. A buffy, cupped, and firm coagulum will form in a deep or narrow vessel, particularly if the blood flow rapidly; whilst neither of these appearances will occur if it be received in a wide and shallow vessel.

184. The *pain* and other local symptoms ought also to guide the practitioner as to the extent to which depletion should be carried. But these should not be exclusively confided in, for the most violent pains, as shown above (§ 82.), are generally independent of inflammation, and are not abated by vascular depletions. Nor are all alterations of sensibility depending upon inflammations to be relieved by bloodletting; for the most severe pains accompanying asthenic inflammations will very often not be even mitigated by it, although altered sensibility in the sthenic forms, now more especially under consideration, will generally be entirely removed by it, if it be actively and judiciously practiced. As long as pain and tenderness on pressure continue, the pulse being firm, resistant, or constricted, and not very frequent, general bloodletting may be repeated, although some exceptions to this rule may present themselves; but in most of these, local depletions may be employed. If the pain return after having disappeared, or if it become exasperated, although bloodletting has been instituted, a repetition of the measure is necessary, unless the other symptoms obviously forbid it; for, in this latter case especially, the first depletion has only relieved the load which overwhelmed the sensibility of the organ, and a second, or even a third, is requisite to restore the circulation of the part to its healthy state.

185. The *absence of pain* ought to be no argument against resorting to vascular depletion, if other symptoms indicate the propriety of it; for intense inflammation may exist in the parenchyma of an organ, particularly the brain, the liver, the lungs, or the kidneys, and even in mucous or serous membranes, without pain being complained of, or without sensibility being further disturbed than is indicated by a feeling of heat, or of oppression, or of weight.

186. The *functions* of the inflamed organ ought also to indicate the propriety of repeating deple-

tion. When they are restored, then the chief object is attained, and no further loss of blood should be inflicted on the patient; but if they continue to be suspended or disordered, or if they are only partially restored or improved, local depletions, at least, are required, especially if due time have been allowed for the first bleeding to produce its effects.

187. The *tongue* furnishes important indications as to the propriety of general or local bloodletting. When the papillæ are distinct and erect, the tongue being white or loaded, and inclined to be dry, or its edges or point, more or less red, vascular depletions are generally necessary. When the fur on the tongue is erect and white, and the sides and point red, blood may be taken away, if no symptoms contra-indicate the practice. On the other hand, when the papillæ or the fur is flat, and the tongue very moist or watery on its superior surface; when it is broad, flabby, fissured, or lobulated; when its edges are indented by, or retain the impression of, the teeth; when it is pale, especially at its point or edges; when it is tremulous on being held out; and when it is covered by a thick, dark mucus or fur; bleeding is generally inadmissible.

188. When the *cutaneous surface* is hot and dry throughout, depletion will be of service; but if it be cold, clammy, and shrunk, or if it be covered by a hot clammy perspiration, bloodletting will be inappropriate, as the chief objects intended to be accomplished by bleeding are to lower general action and to produce relaxation, and these are already attained. If the *urine* is high-coloured, scanty, and does not deposit a sediment, bloodletting may be practised, if other symptoms do not contra-indicate it; but if the urine be pale, limpid, and copious, it will generally be injurious.

189. Besides these guides to the institution and repetition of vascular depletion, there are various others, appertaining to the organ affected, &c., which should guide the physician; but these do not come under consideration at this place. The age, constitution, and diathesis of the patient, and the other states of predisposition, as well as the exciting causes, however, require some notice. The very young (infants) and the aged should be depleted with caution. Persons of a nervous or lymphatic temperament cannot bear so large losses of blood as those who are sanguine, irritable, or sanguineo-melancholic. In the gouty and scrofulous, in the previously diseased, in the ill-nourished, in the very obese, and in persons of a relaxed fibre, or leucophlegmatic or cachectic habit of body, such losses are generally injurious.

190. The nature of the *exciting causes*, and the *influences, mental and physical*, operating on the patient during treatment, should greatly influence the amount of vascular depletion. Inflammations consequent upon active excitement, or attending vital reaction, are most benefited by this measure; whilst those caused by septic, poisonous, infectious, or contaminating agents, are generally aggravated by it. All the depressing affections of mind, an air loaded with malaria or paludal exhalations, the foul air of hospitals, and the confined atmosphere of large towns, particularly in crowded dwellings, in low cellars, in close lanes or alleys, and in manufactories, frequently not only prevent the good effects of bleeding from ensuing, but also render its institution or repetition injurious.

191. The *prevailing epidemic constitution*, or the general character presented by epidemic and other diseases, should always be kept in recollection, especially as respects the employment of bloodletting. The inflammations which occur in the puerperal states, erysipelas, and the inflammatory complications observed in the courses of exanthematous and continued fevers, vary remarkably in their particular characters, according to the prevailing constitution. At the period of change from one general constitution to another, it is very difficult at once to determine upon the admissibility of bloodletting, particularly as regards the diseases just named, and others allied to them; but close observation of the morbid phenomena, and attention to the circumstances and considerations now enumerated, will lead to a right determination as to this practice. Generally speaking, also, it will be found, that all inflammatory diseases attended by a free state of the secretions; by copious fluid defluxions, particularly from the seat of disease; by a moist or relaxed skin, or irregularity and weakness of pulse; by physical and mental depression, and especially by great despondency, unfavourable anticipations of the result, or indifference to objects of former or natural endearment; will either not be relieved, or will be aggravated, by bloodletting.

192. *β. Local depletions* are often sufficient in many forms, states, or stages of inflammation, to accomplish the ends in view. The circumstances requiring *local*, in preference to *general bloodletting*, are chiefly the following: — 1st, The slighter states of inflammatory action; — 2d, Forms of the disease approaching to, or partaking of, the asthenic condition; — 3d, A stage of inflammation too far advanced to admit of, or to be benefited by, general depletion; — 4th, When venesection has been carried so far as not to admit of its repetition, the disease being either unsubdued or only mitigated, and requiring to be aided by this means; — 5th, When it is desirable to derive from the seat of disease, as well as to deplete moderately; — 6th, When it is wished to remove local congestion of the vessels, and to restore the sensibilities and functions of the affected part; — and, 7th, When inflammations occur in debilitated, nervous, or delicate constitutions, and as complications of febrile, or other diseases.

193. The *modes* in which local depletion should be performed also require attention. When a considerable quantity of blood is to be abstracted, and it is desirable to effect a rapid derivation from the seat of disease, then *cupping* is to be preferred; but when the quantity is to be small, and when the application of warm fomentations and poultices to the part subsequently is likely to be serviceable, then *leeches* are more appropriate. Where the morbid sensibility and situation of the parts prevent the having recourse to cupping, a large local depletion being requisite, then a great number of leeches should be applied. In such cases the fomentations and poultices used to promote the bleeding will act beneficially in soothing the altered sensibility, upon which much of the diseased action depends. When the part inflamed admits of the direct application of leeches, it is often doubtful whether they should be placed upon it or not; for in some constitutions the punctures of

leeches are followed by much local and general irritation, or even by erysipelatous inflammation; and if a small number be employed, they only increase the local irritation and determination, without unloading the vessels of the diseased part. In these cases, depletion by more or less numerous or deep scarifications is sometimes more beneficial than by leeches, especially if the vessels are much engorged. It should also be recollected that bleeding by leeches occasions much greater depression, relatively to the quantity of blood abstracted, than by any other mode, especially in nervous and susceptible persons; and that in some constitutions and situations the bleeding from their bites is not readily arrested. When the vital tone and cohesion of the tissues are much weakened, as in febrile and malignant diseases, a fatal loss of blood may take place from them, if the bites be not watched for a considerable time after they are removed. In some cases, *cupping over the bites* of leeches is very advantageous, in abstracting both a greater and more determinate quantity of blood, in preventing a prolonged and weakening discharge from them, and in determining the circulation to the part to which they were applied.

194. In visceral or internal inflammation it has often been recommended to apply leeches over the seat of disease; but, unless some advantage be expected from the subsequent fomentation, no additional benefit will result from the selection of this situation; and, if an intimate vascular connection exist between the part inflamed and that to which leeches are applied, the blood may be injuriously determined thereby to the former place. —When the phlegmasia is entirely visceral, the application of leeches to that part of the external surface which is over the seat of disease, probably effects as complete a derivation from it as when applied to any other situation; whilst the subsequent fomentation tends to equalise the general circulation, and to determine to the surface of the body.

195. In conclusion, the propriety or impropriety of repeating bloodletting in inflammation, as well as of adopting it in the first instance, cannot be inferred from one symptom or consideration alone. The constitution, habit of body, and previous state of the patient, the condition of the various functions, the increase or decrease of the pain and other morbid phenomena in the affected part, and the other circumstances stated above, should chiefly influence our decision upon these important points of medical practice.

196. γ. *Calomel and opium*, as so ably recommended by Dr. Hamilton, should be prescribed in a full dose immediately after the first bloodletting, whenever the inflammation presents an active or sthenic form. In acute phlegmasia of a vital or important organ, from ten to twenty grains of calomel, and from two to three of opium, and one grain of ipecacuanha, may be given at once. This combination will generally succeed in keeping down the general morbid action to that grade to which it had been brought by the depletion, and in preventing reaction from following thereupon. It will also relax the cutaneous surface, determine to the skin, and thereby equalise the circulation. In some cases, smaller doses, especially of the calomel, may be given, and repeated every fourth, fifth, sixth, or eighth hour, according to the urgency of the case, until a decided effect is produced upon the disease. In all sthenic inflammations, the specific effect of mercury upon the tongue and gums is not readily produced; but as soon as it begins to appear, the mercurial medicine should be relinquished, or the dose of it reduced. It is chiefly in cachectic persons, and in the asthenic forms of inflammation, particularly when vascular action is languid or low, or when there is but little excitement, that mercurials, especially in large quantities, are injurious. When sthenic phlegmasia is seated in serous membranes, or extends to them, the decided use of mercury in the combination just prescribed, or in others hereafter to be noticed, is most requisite, in order not only to aid in the resolution of the morbid action, but also to prevent effusion, or the exudation of coagulable lymph, and the several ill consequences shown to depend upon effusion in its various states.

197. When inflammation implicates serous, fibrous, or even parenchymatous parts, preparations of *antimony*, especially James's powder or tartar emetic, may be combined with the calomel and opium, particularly for phlegmasia of the serous membranes of the chest and of the brain, and for pneumonia, &c.; but when mucous surfaces are inflamed, especially the intestinal mucous surface, *ipecacuanha* is preferable, and it may be given in large doses, as two, three, or four, or six grains, in the form of pill, with a full dose of opium. In many cases, also, *camphor* will be beneficially conjoined with calomel and opium; but when it is to follow a large depletion, or when sthenic inflammatory action is not fully subdued, it should be prescribed in small doses, so as to act as a refrigerating diaphoretic. It is chiefly in asthenic inflammations that full or large doses of camphor are required.

198. The *repetition* of calomel and opium, with or without either of the other medicines just mentioned, as to frequency, or the intervals between the doses, as well as the quantities of both, should entirely depend upon the intensity, the seat, and the other circumstances of the disease. The largest doses already mentioned should not be frequently repeated, unless in the most urgent cases. In some instances it may even be sufficient to give them only after each depletion, or to prescribe also, in the intervals, smaller quantities, as may be required. In the less severe states of inflammation it will be preferable to prescribe much smaller doses, as from two to five or six grains of calomel, and a quarter or half a grain of opium, every four, six, eight, or twelve hours, according to the peculiarities of the case, in combination with either of the other medicines already noticed. After depletion has been decidedly employed, these doses will generally be sufficient, even in the more severe cases, and will often give complete relief, without affecting the mouth, their good effects being manifested chiefly on the general and local states of action, on the skin, and on other excreting organs.

199. δ. *Purgatives.*—Unless it be desired to produce a very speedy effect upon the system by calomel or other mercurials given in the above combination, an occasional or even frequent recourse to purgative enemata will generally be necessary, although purgatives taken by the mouth may not then be requisite. Purgatives, however, are amongst the most important remedies used in the treatment of inflammations; their good effects depending upon several circum-

stances: — 1. They evacuate morbid secretions and fæcal accumulations, which injure the organic functions, and depress or otherwise derange the powers of life, and which thereby favour the extension of the local affection, and increase the constitutional disturbance; — 2. They diminish vascular fulness, by increasing the intestinal exhalations, and the secretions of collatitious organs, and thereby lower febrile action; — 3. They determine the blood to the digestive mucous surface, and derive it from remote parts. Owing to this last circumstance, they should be given with due caution when the digestive tube, or even when the viscera associated with it, are inflamed. They are more serviceable in some inflammations than in others; thus they are more efficacious in congestions and inflammations of the head, than in similar affections of the abdominal and thoracic viscera. The selection of, and modes of administering, purgatives, also, are matters of great importance; but are so intimately dependent upon the nature of individual cases, that no general rules can be stated as to these topics. The refrigerant purgatives are usually the most appropriate, as the sulphate of magnesia, and other neutral salts, either alone or with the infusion of senna; the bitartrate of potash with jalap; the spirits of turpentine with castor oil; calomel with the compound extract of colocynth, or with jalap, &c. One of the best modes of administering these medicines is to give them at first, or a few hours after a full dose of calomel or blue pill, in briskly cathartic doses, so as to clear out the bowels, and afterwards to keep up a more gentle action by milder and cooling doses, or by suitable enemata, or by both. The operation, as well as the antiphlogistic effects of these, and of other purgatives that may be employed, will be promoted by adding to them the potassio-tartrate of antimony, or ipecacuanha.

200. ε. *Mercurials.*—Although calomel is one of the best purgatives that can be given in this class of diseases, yet it, as well as other preparations of mercury, is often required for its alterative effects chiefly, not only after bloodletting has been practised, and as above advised (§ 196-8.), but also where depletion should not be adopted. In some cases it is necessary to use every means, and even several simultaneously, in order to arrest the usual course of the disease, particularly in inflammations of serous membranes, and of the larynx, trachea, iris, &c.; and one of these means is the rapid production of the specific effects of mercury. These effects being produced, not only is the resolution of the local morbid action thereby favoured, but also effusion is diminished, and the disposition to form coagulable lymph is entirely prevented. Hence mercurials employed with the view of affecting the system are most useful for inflammations of parts which give rise to albuminous exudations; and are either of little service, or even prejudicial, when prescribed for inflammations of cellular or parenchymatous structures, especially if these assume a diffusive, or spreading, or irritative form. In such cases, other means, hereafter to be noticed, will be found more beneficial. But in acute sthenic inflammations, neither mercury nor any other means should interfere with bloodletting. It may assist in subduing, and in removing, several of the effects of these diseases, but it should never wholly supersede vascular depletion in some form or other. In chronic inflammations, however, where alterations of structure have commenced, and where they are but little influenced by depletion, mercury is one of the most efficient means that can be prescribed for the prevention of further effusion, or other change, and for promoting the absorption of whatever deposition may have already taken place.

201. ζ. *Spirit of turpentine* is hardly known as an antiphlogistic remedy; and yet, from an experience during nearly thirty years of its effects, both in sthenic and asthenic inflammations, I believe that none is more deserving of confidence, if appropriately and prudently prescribed. As I have long ago shown (*Lond. Med. and Phys. Journ.* for July and August, 1820.), the operation of this medicine depends upon the dose, the frequency of the repetition, and the combinations of it with other remedies. Hence it may be made available in every form of inflammation. In the sthenic form it is remarkably serviceable after depletions have been duly practised, and it may be used both internally and externally — in draughts, or in enemata — in liniments, embrocations, or fomentations. In all inflammations tending to copious effusion, or to fibrinous exudation, after bloodletting has been resorted to, and more especially when it becomes doubtful whether general depletion should be prescribed, or repeated, or not, this substance, in hands experienced in its operation, is a most valuable remedy. In these cases it should be given in quantity sufficient to act upon the bowels and kidneys, — either one drachm twice or thrice daily, or from three to six drachms once a day, alone or with castor oil. It may also be administered once or twice a day in enemata in larger quantities. Where it is desired to produce as rapid an impression as possible upon the malady, not only should the one mode of exhibition be made subsidiary to the other, but both should be aided by the external use of this substance, in the form of a warm embrocation, fomentation, or epithem. In such cases I have generally directed several folds of flannel, large in proportion to the extent and severity of the disease, to be wrung as dry as possible out of very hot water, to be instantly freely sprinkled with spirit of turpentine, and applied immediately over the affected organ; to be closely covered, when thus applied, by wash leather, or a dry cloth, to prevent evaporation; to be kept thus applied as long as possible, or as the patient may endure it; and to be renewed as circumstances may require. In less severe cases, or at the commencement of inflammation, I have found a single application of this fomentation instantly arrest the disease, without depletion or any other means beyond a purgative medicine having been employed. In chronic inflammations, the *liniments* containing this substance, prescribed in the APPENDIX (F. 296. 311.), may be used either as such, or as embrocations, or they may be applied over the affected organ, on the surface of warm flannel, in the way just described.

202. The spirit of turpentine, thus employed internally or externally, or both, need not prevent a recourse to calomel, or other mercurials, but may be used, particularly in the more urgent cases, in conjunction with them,—the former aiding the operation of the latter. Although one of the most efficacious means of arresting inflammation and its consequences, there is no remedy that requires more discrimination and experience of its action

and effects, than this. Much of the disappointment sometimes felt as to its operation has been entirely owing to the inappropriate use of it, and to injudicious modes of prescribing it. The practitioner who is well acquainted with its effects, in the various doses and modes of using it, will find it most effective in lowering general action when inordinately excited; in controlling local disease; in arresting the effusion of morbid fluids consequent thereon; and in determining the momentum of the circulation to the intestinal canal, to the urinary organs, or to the cutaneous surface, according as either effect may be desired; and thereby in deriving from the seat of disease.

203. η. *Refrigerants and diaphoretics.*—Of these, the former are generally used in aid of more active measures, with the view of reducing the increased temperature, which aggravates or perpetuates the local morbid action; and the latter are prescribed with the intention of restoring or increasing the cutaneous functions, of thereby equalising the circulation, and of removing a portion of the serous and excrementitious elements in the blood. In many cases, substances acting both as refrigerants and as diaphoretics are most appropriate, or those which exert the former action more readily produce the latter effect. Indeed, whenever vascular action is sthenically excited, the skin being hot and dry, it is necessary to lower the general action, and to give such substances as act in this manner, as the most certain means of procuring perspiration. In the majority of cases, after vascular depletion and other evacuations have been duly employed, the cooling diaphoretics are thus indicated; and, although more active means may be still requisite, particularly those already described, yet these will generally be found useful when taken in the intervals, or as occasions may offer. The diaphoretics which will be found most beneficial are the solution of the acetate of ammonia, camphor, spirit of nitric æther, and a solution, or the wine, of the potassio-tartrate of antimony, which may be variously combined according to the peculiarities of the case.

204. *Warm, vapour,* and *medicated baths* are amongst the most energetic diaphoretics; but much judgment is required in prescribing them; for their effects will entirely depend upon the form, state, seat, and stage of the inflammation against which they may be employed. In acute sthenic inflammations, they should not be resorted to until vascular depletion has been duly employed, and alvine evacuations freely procured. When, however, the stomach or bowels are inflamed, they may precede the use of means for the evacuation of the latter. In chronic inflammations of the internal viscera, or of the joints, fibrous tissues, &c., vapour baths, various fumigating baths, and particularly those with sulphur or camphor, warm baths, especially those containing the decoctions of emollient herbs, or weak alkaline solutions; aqueous vapour with the fumes of camphor, or this latter conveyed around the patient; may severally be brought most advantageously in aid of other appropriate means.

205. ϑ. *Diuretics* are sometimes required in the treatment of inflammations, not merely on account of any derivation from the seat of disease thereby procured, but with the view of reducing whatever serous plethora may exist; and of removing from the circulation, by increasing the action of the kidneys, those ultimate products of assimilation which are liable to accumulate in the blood to an injurious amount, during the febrile state, and thereby to heighten the local affection. With this intention, several of the more refrigerant diuretics may be advantageously employed, especially the spirits of nitric æther, the bitartrate of potash, and the neutral salts in small doses. They may be taken either in the patient's usual drink, or conjoined with the other medicines required by the particular circumstances of the case.

206. ι. *Narcotics* are occasionally beneficial, especially when inflammation is attended by great pain and irritability, and in the sthenic forms after vascular depletion and alvine evacuations have been duly practised. *Opium* and the *salts of morphia* are the narcotics most frequently prescribed, although *hyoscyamus, belladonna,* &c. may likewise be employed in some circumstances.—Opium was much recommended for inflammation by medical writers during the seventeenth and eighteenth centuries, and frequently in combination with other medicines; but its use, or rather its abuse, was also greatly condemned. There are few medicines which require greater discrimination than this, and particularly when given in this class of diseases; for the propriety of having recourse to it will entirely depend upon the seat, stage, and form of the inflammation, upon the constitutional symptoms, upon the means previously employed, and upon the dose and combination in which it is prescribed. Dr. Armstrong advised large doses of opium after bloodletting, in a paper published in 1824 in the "*Transactions of the Associated Apothecaries,*" under the belief that the advantages derived from the combination of calomel and opium, recommended by Dr. Hamilton, were entirely to be ascribed to the latter substance alone. In this, however, he was altogether mistaken; for this single remedy is not nearly so beneficial as in combination with calomel and the other medicines mentioned above (§ 196-8.). Nor, indeed, did the practice present any originality; for it had been employed by numerous writers and practitioners long before he advocated it, even before the periods which I have already assigned. Besides other instances in which I had prescribed it with great benefit previously to this time, I attended a case of phrenitis in 1820, with Mr. Carroll of Walworth, in which three grains of opium were given at one dose, after bloodletting had been carried sufficiently far. In slighter cases, after vascular depletion and the operation of a cathartic, a large dose of laudanum, or of solid opium, has manifestly aided greatly in tranquillising the nervous system, in reducing vascular action, and in procuring refreshing sleep; the patient awaking with a soft or moist skin, and with freedom from pain. Dr. Stokes has recently adduced evidence in favour of this practice, and shown that it is peculiarly beneficial in cases of recent inflammation of serous and mucous membranes, where bloodletting and other antiphlogistic remedies are inadmissible, and where the system is greatly depressed. In most instances, however, opium, or the salts of morphia, will be more advantageously combined with calomel, as above advised (§ 196-8.), or with ipecacuanha, or with camphor, or with James's powder, or the other preparations of antimony. Where pain is so excessive as to constitute the most prominent symptom, it is a most important remedy. When great exhaustion follows bloodletting, owing to its having been carried too far, or improperly resorted to, opium and camphor con-

joined are most valuable medicines; and in the asthenic forms of inflammation especially should never be overlooked, particularly in conjunction with other means. The salts of morphia in similar combinations will be found equally beneficial.

207. The other narcotics, as *hyoscyamus, conium, stramonium, belladonna*, &c., are less useful in inflammations, and not so generally appropriate as opium; and yet instances often occur, in which a large dose of some one of these, according to the features of the case, may be preferred; and, after bloodletting and alvine evacuations have been duly practised, and in the combinations already mentioned (§ 196-8.), will be found frequently of service. The chief recommendations in favour of these are—the circumstances of their not interrupting or suppressing the functions of secretion and excretion, and of their relaxing spasm of circular fibres and canals, as well as allaying irritation. It should, however, be admitted, that when opium is prescribed in large doses, it does not interrupt secretion or constipate the bowels so remarkably as when given in smaller quantities; and that these effects are then frequently even not observed.

208. *κ. Sedatives.* — Of these, *colchicum* is the most active; and in certain kinds of inflammation especially, as the rheumatic and gouty, the most serviceable, when prudently prescribed. In the sthenic forms, also, of phlegmasia, it may often be advantageously brought in aid of other means. When it is desired to promote the secreting functions of the kidneys, and thereby to eliminate from the blood urea and its combinations, or other materials which would increase the local and general affection, if allowed to accumulate in the blood, then colchicum may be made a valuable remedy. Also, when inflammations are attended by a torpid or obstructed state of the liver, this medicine, conjoined with deobstruent purgatives, will be of essential service. In cases attended by very acute pain, or by the effusion of fluids from the inflamed part, it will also be of service, particularly when judiciously combined with other means; but its action should be carefully watched, as in some constitutions it produces most depressing and even injurious effects. It is best conjoined with camphor, the alkaline carbonates, magnesia, the neutral salts, and other purgatives; and is most serviceable after depletion and alvine evacuations.

209. *Digitalis* has been more generally employed than colchicum in inflammatory complaints, although it is a less efficient, and even a more uncertain, remedy than it. As long as vascular action is acute or sthenic, digitalis, even in large doses, exerts but little influence upon the circulation; whilst its cumulative effects will sometimes appear as soon as the symptomatic fever abates. It is most serviceable as an adjunct to other means, whose operation is more decided and certain, especially where effusion has commenced, or is about to commence, from the diseased part; when inflammation attacks debilitated, cachectic, or delicate persons, who cannot bear general or free bloodletting; and when it assumes slight, chronic, or subacute forms.

210. *The preparations of antimony*, particularly the *potassio-tartrate*, given in large and frequent doses, produce a sedative, or, according to Rasori and his followers, a *contra-stimulant*, effect. After causing vomiting, they act upon the bowels and skin, and reduce the pulse in strength, fulness, and sometimes in frequency. For inflammations of the thoracic viscera, and of the brain and its membranes, a decided and judicious use of these medicines, after due vascular depletion, is generally of great service; but they should never supersede this latter, although they may prevent the having recourse to very large or repeated bloodlettings. In other circumstances, as well as in those just instanced, these preparations are very beneficial, particularly when conjoined with opiates or other narcotics; they lower general and local vascular action, relax the cutaneous surface, favour perspiration, and equalise the circulation.

211. The potassio-tartrate of antimony is seldom prescribed as an emetic in sthenic inflammations, unless in those affecting the respiratory organs and passages. In order to procure its depressing effects, a quarter or a third of a grain is usually given every two or three hours. The first two or three doses may cause vomiting, but nausea and a lax state of the skin and bowels will subsequently be the chief effects. Chronic inflammations are often subdued by this medicine, and the most successful results frequently follow it in delicate constitutions, when bloodletting does not promise any decided advantage. It should not, however, be carelessly employed, as I have seen it productive of the most injurious effects when pushed far in debilitated persons, and in young children. In smaller doses, as from the one fifth to the one tenth of a grain at the same intervals, it produces a salutary diaphoresis. To effect this, however, it is seldom given alone, but is usually conjoined with camphor mixture, solution of the acetate of ammonia, the spirits of nitric æther, and sometimes with a small quantity of sulphate of magnesia or of the nitrate of potash.

212. The employment of large doses of tartar emetic in inflammations originated in Italy; and although it was at first discouraged by British practitioners, yet the experience of the ablest physicians in this country and on the Continent has now fully decided in favour of the practice. Since 1819, I have generally resorted to it in the manner just mentioned, especially in the treatment of inflammations of the respiratory organs, and generally with great benefit. There are few cases which, if promptly treated by bleeding, and subsequently by this medicine, will not be very materially relieved; and in those which have been neglected, or in which the proper time of bleeding has gone by, this substance, with mercury, or with the solution of the acetate of ammonia, or with opium if it irritate the digestive canal, or with other appropriate means, will frequently prove of great service.

213. The empirical powder, introduced by Dr. James, is the next to tartar emetic, as an efficacious preparation of antimony in the treatment of inflammations. The *pulvis antimonii compositus* in the *Pharmacopœia*, which was intended as a substitute for it, cannot be depended upon. The different effects of these medicines have been attributed by Dr. Thomson to the fact of the antimony in the former being a protoxide, which is soluble; in the latter a peroxide, which is insoluble. Mr. Phillips seems to confirm this in his translation of the *Pharmacopœia*. In numerous cases of inflammation, and in many circumstances, *James's powder* should be preferred to any other antimonial. In *children*, particularly those which are very young, and for inflammations of

the pulmonary organs, as well as of the brain and its membranes, in this class of patients, it is generally the best preparation of antimony, and the best sedative, that can be prescribed.

214. *Cold* is one of the most powerful sedatives, and one which is not always judiciously employed. There are few agents which are more efficient in constricting the vessels of the part, than it. Also, by altogether removing the principal stimulus to, as well as the chief consequence of, vascular excitement, namely, increased temperature, it prevents the consequent exhaustion of the tone and vital cohesion of the capillaries and inflamed tissues. Yet, in medical practice, its appropriate use is comparatively limited; for it cannot be brought to act upon the majority of internal inflammations in such a manner as to insure its good effects, or without interfering with other means upon which still greater dependence may be placed. It is also applicable only to the sthenic and acute forms of inflammation; for it is generally injurious in the asthenic and specific varieties, particularly the diffusive, erysipelatous, gouty, and rheumatic. In all cases of visceral inflammation where the application of cold tends to constrict the external surface, and to determine the circulation to internal parts, cold can rarely be advantageously prescribed; for even when employed internally, or in enemata, it can seldom be prevented from superinducing reaction, or be so applied as to keep down vascular action for a continued or prolonged period. It is, however, different with inflammations of the brain or of its membranes; for the comparatively superficial and isolated situation of the diseased parts, their distance from the centre of the circulation, the minute division of the vessels in these organs, and the complete manner in which cold applications may be made to surround the whole seat of disease, — in the form of the cold affusion, the ice-cap, evaporating lotions, &c., — combine to render cold more beneficial in these inflammations, than in any others affecting internal organs.

215. It has likewise been recommended to employ cold in the treatment of other visceral inflammations, as in pneumonia, enteritis, peritonitis, &c. Breathing very cold air has been tried in the first of these by practitioners of the United States of America, and cold applied to the abdomen in the others by Dr. SUTTON and by several German physicians, but with very doubtful advantages. Indeed, the results of such practice may be tolerably accurately inferred *à priori*.

216. Amongst other sedatives, mention may be made of the *tepid bath*, and the *tepid affusion* or *douche*. These, by abstracting heat, exert a depressing effect, and slightly constrict the surface. When the heat of skin is very considerable, the pulse being rapid and somewhat hard or resistant, the tepid bath is to be preferred to the warm bath, as it not only cools the surface, but also generally favours diaphoresis with more certainty than this latter. Indeed, in acute sthenic inflammations, the warm bath should not be used of a higher temperature than 96°, unless in cases presenting peculiar features. The tepid bath, or affusion, is frequently more appropriate in the early and acute stages of inflammation than the cold on the one hand, or warm, vapour, or medicated baths, on the other; as it gradually reduces the temperature without favouring the occurrence of reaction. Warm, vapour, and medicated baths are most serviceable at advanced periods of inflammation, after evacuations have been freely procured, or when the disease becomes chronic or complicated.

217. *The abstraction of all causes of irritation*, as well as of the exciting causes of the disease, is obviously requisite in the treatment of inflammation. The excitement of the senses, especially of the organs of sight and hearing, and of the mental faculties, should be carefully guarded against. Muscular action, and stimulation of the stomach by heating food and beverages, ought also to be prevented; the antiphlogistic regimen being strictly enforced in all its parts.

218. λ. *Derivatives and counter-irritants.*—These should never be employed until the general vascular excitement is subdued by bloodletting and other evacuations; and until a powerful impression has been made upon the local affection. These ends being attained, the *mode* of derivation or counter-irritation should next be considered. This should depend upon the seat, form, and duration of the inflammation, and the consequences to which it may already have given rise. — In acute cases, and at early stages of the disease, the *hot turpentine epithem*, or application, already described (§ 201.), is the most efficacious, the safest, and the most immediate in its effects. It should always be applied over the inflamed organ, or as near it as possible. It is applicable to all forms of inflammation, in whatever organ they may be seated. It tends, more than any other derivative, to determine the circulation to the cutaneous surface, and to prevent the more dangerous consequences of the disease.

219. *Sinapisms* are extremely serviceable, and produce their effects rapidly, but they are less efficacious than the turpentine epithem. — The application of the strong *solution of ammonia*, with tincture of camphor and spirit of rosemary, as advised by Dr. GRANVILLE, is also of use, and especially in weak, irritable, or nervous persons, and when inflammatory irritation is attended by much pain. It produces a very rapid effect, and either a superficial and slight, or a more severe and caustic, action, according to the duration of the application. — The liniment employed as a counter-irritant by the notorious empiric, St. John Long, was recently analysed by Dr. MACREIGHT, who found it to consist of oil of turpentine and acetic acid, held in suspension by yolk of egg. Having prepared a liniment consisting of *one ounce and a half of oil of turpentine, of one ounce of strong acetic acid, three ounces of water, and the yolk of one egg*, the three last being rubbed together, and the first being afterwards added, Dr. MACREIGHT found it, in its sensible properties and effects, to be identical with the empirical medicine. That a liniment consisting of these ingredients should prove of essential service in many cases, cannot be doubted. For upwards of twenty years, and for several years before this fashionable empiric appeared, I had frequent recourse to a liniment, consisting of equal parts of the compound camphor liniment and the compound turpentine liniment, with a little cajuput oil, as a counter-irritant; varying it, however, according to the peculiarities of the case, and as prescribed in various parts of this work, and in the APPENDIX (see F. 296. 311.). When this liniment, or any of the others just referred to, is applied on the surface of

warm flannel, or of a cloth wrung out of hot water, over the situation of internal or deep-seated inflammations, it produces an almost immediate effect. But friction during ten or fifteen minutes with the cold liniment will give rise to erubescence, sometimes to exudation, and more or less decided relief. In acute cases, the former mode of application may be adopted; but in chronic or sub-acute inflammation, particularly when alteration of structure has taken place, repeated frictions with this liniment, short of inflaming the skin, are often to be preferred. When the irritation produced by it gives rise to vesication or abrasion of the cuticle, the parts soon heal; but it is frequently of service to continue this effect for some time, by the repeated or prolonged use of the application.

220. *Blisters* may be employed as counter-irritants in three modes: — 1st, as rubefacients; — 2d, as simple and slight irritants; — and, 3d, to procure a puriform secretion from the part. In acute inflammations they ought not to be prescribed until bloodletting has been carried as far as circumstances will permit; and in early periods of the disease, they should not be applied longer than seven or eight hours, and a warm bread and water poultice should be placed over the part, to promote the vesication, and to prevent the irritation sometimes consequent on them. It will occasionally be advisable to place tissue paper between the blister and the surface. On *children,* blisters ought not to be applied longer than from three to six hours, and warm poultices should generally replace them, and be renewed frequently. For sub-acute and chronic inflammations, or for the advanced stages of the acute, blisters may be prescribed for a longer period, and sometimes with the intention of procuring a sero-puriform discharge from the blistered surface.

221. *Warm pediluvia,* the *hip-bath,* and the *semicupium,* are often useful modes of derivation, when the head or the thoracic viscera are affected, or when it is desirable to excite the uterine discharge. Their effect will generally be promoted by the addition of mustard and of common salt to the water. But, in acute inflammations, the temperature should not be too high, or such as may heighten the general vascular action. They also ought not to be resorted to until depletion and alvine evacuations have been duly practised. Besides these, there are other substances sometimes used to produce counter-irritation and derivation, as *croton oil,* the powder or tincture of *capsicum,* bruised *garlic,* and scraped *horseradish.* They quickly produce a rubefacient action when applied on the skin; but are not so efficient in the severer cases of acute inflammation, as those previously noticed. They are all, however, often of service, particularly in the slighter forms of the disease, that are attended by acute pain. Besides these, *cupping* with scarification, and *dry-cupping,* are serviceable modes of derivation in the sthenic forms of phlegmasia.

222. The foregoing modes of counter-irritation are most serviceable in recent, acute, or sub-acute inflammations. Those which are about to be noticed, act chiefly as suppurants, and are most suited to the chronic states, or to the more advanced stages, or rather to certain of the consequences, of the acute and sub-acute forms of inflammation. They consist chiefly of ointments or plasters containing the *potassio-tartrate of antimony,* or *cantharides,* or *savine;* the decorticated *bark* of the *mezereon root,* moistened in water or vinegar, and applied to a small portion of the cutaneous surface; *croton oil,* either alone, or suspended in twice the quantity of camphor or soap liniment or olive oil; *issues* and *setons* of various forms and kinds; *moxas,* and the *actual* and potential *cauteries.* The exact circumstances requiring either of these means in preference to others are so numerous, — the choice of them depending so entirely upon the seat, peculiarities, and stages of the disease, upon the constitution and diathesis of the patient, and upon the other remedies employed, — that no general rules can be stated for the guidance of the inexperienced in this respect; the powers of observation, experience, and views of the practitioner must be his chief guide in the adoption of these, as well as of many other means of cure.

223. It has been very justly remarked by my early friend and former colleague, Dr. DUNGLISON, in his very judicious observations upon the use of revellents in the phlegmasiæ (see his excellent work, entitled, *General Therapeutics, or Principles of Medical Practice, &c.* 8vo. Philadelph. 1836, p. 363.), that when we are desirous of maintaining a succession of revulsions, or a constant revulsion, we employ either repeated blisters, or keep the blistered surface discharging by applying some of the other means just mentioned. Tartarised antimonial ointment is well adapted for chronic inflammations, as of the lungs, — because, whilst the pustules induced in any one part of the exterior of the thorax, or elsewhere, are going through the stages of increment and maturation, a fresh crop may be elicited on some other part of the chest; and thus a succession of irritations can be developed, which is more beneficial than one that is more permanent.

224. It is of importance to determine the *extent of surface* to be affected by a revulsive application. This is not always so easy a matter as may be supposed; for, if the vital conditions be affected by it in a very limited extent of surface, the morbid action, intended to be remedied, may be entirely uninfluenced by it: and, on the other hand, if a very large surface be irritated, constitutional disturbance will be thereby excited; or that depending upon the primary disorder, as well as the disorder itself, will be aggravated or perpetuated. — As to the *time,* during which the counter-irritation should be maintained, but little can be stated; for it must depend almost entirely upon the circumstances of the case. On this topic, Dr. DUNGLISON remarks, that it is chiefly when the diseased action has been prolonged for a considerable period, and in affections of a neuralgic kind, that sudden and violent revulsions are productive of the most marked advantage. In the different phlegmasiæ, revulsions which implicate a greater extent of surface, and are more prolonged in their action, are decidedly preferable. In the former cases, moxas and the cauteries may be employed; in the latter, rubefacients and vesicants.

225. The permanence or remittence of the counter-irritation deserves consideration in every case for which this means is prescribed. In most of the phlegmasiæ, remittent revulsion is more serviceable than a prolonged or permanent revulsion. Dr. DUNGLISON justly observes, that when an artificial irritation, accompanied or unaccompanied with increased secretion from the part, has been

established for some time, it ceases, in a great measure, to be a morbid condition, and cannot be arrested without an inconvenience, or risk to some organ predisposed to disease; but if a succession of irritations be produced, the system never becomes habituated to them, and the repetition of the irritation, after a short period, is as beneficial as at first. A succession of vesicants, therefore, is to be preferred to a more permanent application; setons and issues losing much of their beneficial influence in the latter periods of their employment.

226. BROUSSAIS, and many of his followers, have contended that revulsive irritations should be stronger than the morbid action they are intended to replace, otherwise they tend to increase the latter; but although it is manifestly necessary to reduce the inflammation as much as possible by depletions, before counter-irritants are prescribed, yet great good will result from the judicious use of them. There are also several that may be very safely employed early in some of the phlegmasiæ, and even before depletions have been practised, as the turpentine epithem, liniments, &c. (§ 201.219.). I therefore agree with Dr. DUNGLISON, in believing that good will be derived from revulsants in appropriate cases, even should they fall short of the precise degree necessary for completely putting an end to the disease for which they were prescribed.

227. The *situation* to which revulsants or counter-irritants should be applied, relatively to the seat of inflammation, is deserving of attention, especially as a contrariety of opinion exists on the subject. And yet the very terms here used ought to guide the practitioner to the application of them to parts which are not supplied with branches of the same nerves and blood-vessels as proceed to the seat of disease. Much, however, should depend upon the nature of the adopted revulsant; for the turpentine epithem or embrocation will never be injurious, but generally beneficial, however close it may be applied to the inflamed organ. But it is different with blisters and other counter-irritants. I cannot agree with Dr. THOMSON's and Dr. CHAPMAN's recommendation to place these "as near as possible to the affected part." I have often seen mischief result from the early application of a blister to the scalp in meningitis and encephalitis, and to the throat in laryngitis and tracheitis. When, however, the inflammation is of an asthenic or adynamic kind, or when the sthenic form has given rise to effusion, blisters, as well as several other counter-irritants, may generally be applied close to the diseased organ. Yet, even in these circumstances, exceptions to the rule are not few. The choice of situation must therefore depend upon the seat and character of the phlegmasia, and other peculiarities of the case: precise directions respecting it can be given only when discussing the treatment of particular inflammations. In all cases the choice should be guided, as M. BEGIN remarks, by sound physiological principles; for they only can render this mode of practice more certain than it has hitherto been, and prevent the inconveniences which often follow it.

228. It has been already stated that blood-letting, both general and local, may be so instituted in several of the phlegmasiæ, as to derive from the seat of disease. The older writers paid much attention to this method of depleting. Bleeding from the saphena vein, the feet and legs being immersed in warm water, was often prescribed for phlegmasiæ of the viscera, and particularly when consequent upon suppressed evacuations: and bleeding from the vicinity of the anus by leeches is generally adopted by foreign physicians, for inflammations of the liver, stomach, &c. Indeed, to derive the impetus of the circulation from the seat of the phlegmasia by vascular depletion, by cathartics or other evacuations, and by counter-irritants or other revellents, both internal and external, must always be a principal indication of cure, in this class of diseases.

229. *μ. Of applications to the inflamed part itself*, there are some that require a particular notice. They may be all comprised and considered under the following modes of operation: — 1st, Those which reduce the temperature, and thereby remove one cause of morbid irritation, and of vascular expansion; — 2d, Those which soothe the morbid sensibility or diminish pain, either by their influence upon the affected nerves, or by diminishing the tension, rigidity, or pressure of parts; — 3d, Those which constringe the expanded capillaries, restore their lost tone, and prevent the stagnation of the blood or promote the circulation in them; — and 4th, Those which protect the part from external irritants, &c. It is obvious that many local applications produce benefit by acting in more than one of these modes; but still they may be referred to one or other of these especially. Moreover, many internal means of cure act upon the part affected, particularly in visceral phlegmasia, in one or other of these ways. As *topical means* are applicable chiefly to external inflammations, which are generally viewed as belonging to the province of the surgeon, my remarks respecting them will be as brief as the importance of the subject will permit. Yet it must not be overlooked, that most external inflammations, particularly when spontaneous, are merely symptomatic of constitutional disorder — are only the external manifestations of visceral or general disturbance, or of hereditary vice, — that they all react upon the frame through the medium of the organic nervous and vascular systems, — and consequently, that, whilst local remedies form only a part of the treatment required, the rest being employed with reference to the internal and constitutional affections, the entire treatment, even in the external phlegmasiæ, is more strictly medical than surgical, if, indeed, the distinction should be at all entertained.

230. (*a*) *Of those applications which directly reduce the temperature*, some notice has already been taken (§ 214.). They have generally the effect, not only of removing a principal cause of excitement and irritation, but also of constricting the morbidly expanded vessels. *Cold applications* are, however, often injurious, and consequently inappropriate or hazardous, whenever the external inflammation is merely the outward expression of internal or constitutional disorder, as in gout and erysipelas: they are less so, however, in sthenic than in asthenic or specific inflammations. For in the sthenic phlegmasiæ, the vital energies are capable of resisting their sedative influence, and the suppression of the local affection rarely endangers internal viscera. But in the other kinds of inflammation the repulsion of the external affection often caused by these applications is frequently followed by serious internal disease. In such cases the source of mischief is in the frame,

and in some important or vital organ; and when the effects are prevented from appearing externally, they often break out in some internal viscus.

231. Of the numerous *cold applications*, there are few which are preferable to the *solution of the di-acetate of lead*, inasmuch as it combines astringent with cooling and sedative properties. But this, as well as the common *cooling* or *evaporating lotions*, and *cold or tepid water-dressings*, should be suited to the intensity of the inflammations, and be used unremittingly, until the local affection is subdued; for if employed only at intervals, or if at all intermitted, reaction will take place in the inflamed part, and the disease will be thereby aggravated, or at least perpetuated. We observe this in the treatment of *scalds* by cold applications, when used in this latter mode. When the inflammation is of a specific or asthenic kind, and when it is attended by great tumefaction and excessive pain, or when cold applications do not give relief to the pain in a short time, they ought either not to be employed at all, or not to be continued, but give place to very different means. Also when they produce general chilliness, they ought not to be persisted in.

232. (*b*) *Applications which soothe the morbid sensibility* are perhaps more generally appropriate, and are certainly less dangerous in the symptomatic or specific phlegmasiæ just alluded to, than those which are cold. They all more or less diminish the tension of rigid and unyielding tissues, lessen pressure on sensitive parts, and have an emollient and soothing effect. *Moist warmth*, employed in various ways, but especially in the form of *steam, simple and medicated*, and of *fomentations, poultices*, and *warm baths*, also either simple or medicated, &c., is the principal agent by which the physician or surgeon produces these effects. *Steam*, or warm aqueous vapour, has lately come into notice in the treatment of inflammations; and we are indebted to Dr. MACARTNEY and Dr. WILSON for a knowledge of its virtues in respect of its topical external use; for as regards its internal employment by *inhalation* in affections of the respiratory organs, it has been long prescribed. (See ASTHMA, and BRONCHI — *Inflammations of*.) In the form of the vapour bath, it has also been generally used, particularly in circumstances already noticed (§ 204.). By very simple yet suitable appliances, *steam*, either of water alone, or of water containing various *narcotic* or *emollient herbs* or *extracts*, or *camphor*, or *acetous* or *terebinthinate substances*, may be brought in contact with, or entirely surround, the seat of inflammation. It may likewise be *inhaled* into the lungs for the affections referred to, either in its simple or medicated states. When employed externally, and particularly to a limited extent of surface, it should be continued for a very considerable time, and at a somewhat higher temperature than when inhaled. The substances, also, whose fumes are conveyed in the vapour or steam, may be used in much greater quantity when applied thus externally and locally, than when prescribed internally. *Fomentations* and *poultices* containing emollient, narcotic, or other medicines, are also efficacious, not merely by the moist warmth they afford, but in great measure by the impression made upon the nervous tissue by the particular medicinal substances they contain. The same remarks apply to medicated warm baths.

233. It is principally for inflammations attended by excessive pain, by much constitutional irritability, by a very frequent and irritable pulse, and depressed vital powers, that the warm and soothing applications now mentioned are required. Hence they are generally appropriate in the specific and asthenic inflammations: and in them especially afford very great relief, particularly when brought in aid of judicious internal treatment and suitable regimen, and employed early in the disease.

234. (*c*) Applications which constringe the expanded capillaries, restore their lost tone, and prevent the stagnation of the blood, or promote the circulation in them, are suitable to certain states of the advanced stages, and to some of the consequences, of sthenic inflammation. They are also appropriate to most of the specific and asthenic phlegmasiæ from their commencement. When the former proceeds to ulceration, and especially if this assume a spreading or phagedenic form, the more energetic astringents, as the various *turpentines* and *balsams;* certain *metallic salts*, particularly solutions of the sulphates of zinc, of copper, iron, &c., of the nitrate of silver, and of the acetates of lead, zinc, &c.; the dilute *mineral acids;* solutions of the *chlorinated soda*, of the *chloride of lime*, and of the *chlorate of potash;* various *vegetable astringents* and *tonics; creasote, camphor*, the *vegetable acids*, &c.; are severally beneficial in such circumstances, when suitably prescribed and combined with other appropriate means — in some instances with narcotics, and in others with mucilaginous or albuminous substances, — occasionally in aqueous vehicles, and sometimes in unguents, cerates, &c. It is chiefly, however, when the states or consequences of inflammation just noticed are external or near the surface, or within reach, that applications containing any of these are found useful; yet even when seated in internal surfaces, as in the intestinal and respiratory, they are occasionally beneficial, employed either in the form of draught, pill, and enema, or by means of the inhalation of aqueous vapour partially charged with the fumes of some of them. Although it is chiefly for the advanced stages or consequences of asthenic inflammations that astringent substances are required, yet the early and acute stages are also sometimes benefited by them, however stimulating or irritating they may seem to be. Thus, in scalds, and in certain states of burns, the application of a cloth wetted with spirits of turpentine will generally not merely afford relief, but hasten resolution of the inflammatory action. In such cases it may be truly said with SHAKSPEARE that,

> "One fire burns out another's burning."

235. (*d*) Substances which protect the inflamed surface from the irritating influence of the air, and of the exhalations floating in it, are extremely beneficial in all cases in which the part is abraded or its continuity injured. They are, however, less useful when they prevent the morbid secretion of the inflamed part from being discharged. In most cases, therefore, they should be so employed as to prevent any accumulation of this secretion from taking place, whereby the surrounding tissues might be contaminated. Most of these substances are advantageously made the vehicles of astringent or detergent medicines, thereby diminishing the discharge by constringing the extreme vessels, as well as excluding a chief cause of irritation, and of

the consequent morbid secretion. The principal advantage derived from plasters, cerates, ointments, &c., is owing to the exclusion of the air by them from the abraded or divided surface. In many cases of injury, the fibrinous lymph exuded from the extreme vessels, by coagulating over them, protects them from irritation; and were this natural protection more frequently allowed to remain, and confided in, inflammation would less frequently supervene on these cases, than it otherwise does. The albuminous exudations, formed on superficial ulcerations and inflammations of exposed surfaces, protect them in a similar manner, and dispose them more readily to heal; and if the inflammatory action should at any time be exasperated, so as to give rise to an increase of the morbid secretion or to the production of pus, underneath the protection thus formed, the mischief will often soon subside, and the secretion become absorbed, the parts healing under the scabs, or dried lymph or albumen, covering them. Superficial sores, when protected by the *white of egg*, often heal underneath; and dressings with this substance, by entirely excluding the air, are often more serviceable, in preventing inflammation after incised wounds, and in promoting union, than any other. Strong solutions of the *nitrate of silver*, or of *sulphate of copper*, or *sulphate of zinc*, or other *astringents*, applied to ulcerating surfaces, not only excite the organic nervous tissue, and constringe and give tone to the exhausted extreme vessels; but they likewise coagulate the albuminous portion of the secretion, and thereby protect the part against the iritating influence of the air. They also change the morbid secretion, causing it to assume a more healthy character. Substances which either simply protect a raw inflamed surface, or act in the more complex manner just mentioned, are especially serviceable in cases exposed to the influence of impure air, whether the impurity proceeds from terrestrial exhalations, or from animal emanations, as in the wards of an hospital, or in close, low, or crowded habitations.

236. ii. TREATMENT OF ASTHENIC INFLAMMATION.— When phlegmasia presents the asthenic form, the treatment should be very different from that recommended above. The states of organic nervous power and of vascular action differ from those attending the sthenic conditions; and as the differences are great, so should the indications of cure, and the means employed to accomplish them, be different. As all the modifications of asthenia depend chiefly upon two classes of circumstances, — upon depressed conditions of the constitution, and weakened functions of the viscera concerned in assimilation and excretion, and upon the sedative, poisonous, or septic nature of the exciting causes, — so all the indications of cure ought to be determined, and the remedies selected, with strict reference to these circumstances. If the local phlegmasia is associated with, or consequent upon, general asthenia or debility, vital power must be augmented by suitable means; otherwise the local disease will more readily terminate unfavourably, especially if it exist in much intensity. If, in addition to general or constitutional adynamia or asthenia, there be impaired excretion, and consequently accumulation of effete elements in the blood, or deterioration of it, not only must vital energy be supported or roused, but also the excreting or eliminating functions must be excited, and means employed which may correct or change the morbid tendency or conditions of the blood; for if these ends are not attained, the structural lesions which the inflammation rapidly induces, instead of being arrested, or terminating in spontaneous resolution, would be rapidly accelerated, and themselves become the source of further local disorganisation, and of constitutional contamination.

237. Asthenic inflammations, whether depending upon original, acquired, or accidental states of the frame, and of the vital organs, or proceeding from specific causes, require a treatment directed more strictly to the conditions of vital power and function — to the constitutional affection and the existing visceral disorder — than to the local disease; and they moreover require this kind of treatment much more than the forms of phlegmasia already considered. In the latter, the constitution and the vital organs have generally been either unimpaired or not materially affected, before the local disease originated and drew them within the circle of its sympathies; in the former, either the constitution, or some important viscus, or both, have been seriously deranged before the inflammation appeared, — this latter being either the consequence of, or an accidental contingency upon, such derangement, and depending upon it in its subsidence, as well as in its appearance. Even when the asthenic forms of inflammation more especially proceed from specific or septic causes, still very much of their local characters and of their constitutional effects depend upon pre-existing states of vital energy and of the assimilating and excreting functions. To these, in their antecedent, as well as in their existing conditions, the attention of both physician and surgeon ought to be mainly directed; and neither the one nor the other will discharge his duties, if he does not connect the forms and changes of the local affection with the constitutional disorder and the visceral derangements, and treat each of them with strict reference to the rest.

238. Although *indications of cure* should not be followed in succession, nor acted upon individually, and without regard to their joint operation, — although attempts at accomplishing one intention, without endeavouring to attain others at the same time, should not be made in asthenic, any more than in sthenic, inflammations, — yet it will be necessary to have just ideas, as to the principal objects to be attained, in order to arrive at a successful issue; and as to the importance and applicability of them severally in the treatment of each particular case. These *objects* or *intentions* should be entirely based upon the characters assumed by the constitutional commotion, by the visceral disorder, and by the inflammation, — the seat and cause of the phlegmasia, and the circumstances immediately connected with the patient, being also taken into account. Upon these, the activity with which each indication of cure should be pursued, and the importance assigned to one or more of them, should chiefly depend. Influenced by these considerations, and by the phenomena and progress of asthenic phlegmasiæ, the physician, in their treatment, will propose to himself — 1st, To promote organic nervous power, and thereby to enable the constitution to resist the progress of the local disease; — 2dly, To preserve

or to restore the healthy state of the circulating fluids, and the crasis of the blood, by promoting the excreting or depurating functions, and by other appropriate means; — and, 3dly, To assuage the urgent symptoms referrible either to the local malady or to the constitutional affection. The means which most efficiently fulfil the *first* of these intentions, will generally also promote the attainment of the second and third; and whatever has the effect of accomplishing the *second*, will also most materially advance the other indications.

239. *A. The constitution will generally be enabled to resist the local progress of the malady*, by whatever increases the tone or energy of the organic nervous system, through the medium either of the digestive canal, or of the respiratory organs, — by means of appropriate tonics and stimulants, and by a dry, pure, and temperate air, duly renewed. All asthenic inflammations have a tendency to spread or to extend themselves with a greater or less rapidity, and to terminate unfavourably,—the changes that successively arise, tending to gradual disorganisation, or to more immediate sphacelation. Unless under the influence of agents which rally the constitutional powers, they seldom or never show a disposition to spontaneous resolution, as often observed in sthenic phlegmasia. The only exceptions to this rule are met with in those asthenic inflammations which constitute a part of specific constitutional maladies; and these are mere symptoms, or parts only, of these maladies, and are generally co-ordinate with and dependent upon them, in their rise, progress, and decline. This tendency to spread, and to give rise to a succession of unfavourable changes, constitutional as well as local, requires agents possessing powers of sufficient activity to meet the intensity of the disease. As this tendency depends upon depressed organic nervous energy, and deficient vascular tone, as shown above (§ 58.); and as the permanent fluidity of the effused fluids, and their infiltration, and contamination, of the surrounding tissues, depend upon these pathological states; it is obviously requisite to employ such means, as attentive observation and enlightened experience have proved to be most efficient in removing them. All parts which are the seat of asthenic inflammation rapidly lose their vital cohesion or tone; and this loss is participated in, not only by the extreme vessels, giving rise to a copious morbid effusion, but also by the tissues affected. The chief pathological conditions, from which all the consecutive changes have been shown to proceed (§ 162. *et seq.*), manifestly require an energetic recourse to those means which will enable the constitution to resist the progress of the local mischief. Where cellular or adipose tissues are implicated, the extension of disease, and even of disorganisation, will be rapid, if organic nervous energy be not promoted, and if vascular action in the seat of inflammation be not changed, by suitable remedies. In such cases, the constitution must be enabled, as JOHN HUNTER ably contended, to form coagulable lymph, either in, or around, the inflamed part, — or, in other words, to change the fluid and often septic matter effused in the areolæ of the tissues, that extends the mischief by infiltrating and contaminating them, into coagulable lymph or albumen, whereby these areolæ may be rendered impervious to the more fluid part of the effused matter, and the progress of the local malady may be more readily limited.

240. The *principle* of treatment in asthenic inflammations being established, the *means* by which it may be most successfully carried out in practice will be readily found; although the application of these means, appropriately to the varying phases of individual cases, requires great discrimination and care. In the truly asthenic forms of phlegmasia, the principle contended for must be acted upon with decision, and without wavering or temporising. In the treatment of them, doubt or hesitation is fraught with danger; and proceeding, as either generally does, from ignorance of the true source and relations of the local malady, there will be every reason to fear that much of both positive and negative wrong will be further perpetrated. The ignorant are usually presuming; and the half informed, self-sufficient. In other professions and avocations, the evils produced by both are comparatively trivial; but, in the practice of medicine, their consequences are of fearful and immeasurable importance to humanity. I have seen numerous cases of asthenic inflammation die in succession, without the occurrence of a single instance of success to lull the suspicion that true principles of practice had not been adopted; and yet the same principles were blindly pursued in each successive case. In a country where the most trivial invasion of the rights of property is visited by the most condign punishment, human life may be sacrificed to an extent that more than rivals both the pestilence and the sword, by ignorant pretenders to medical knowledge — by the totally uneducated as well as by the half instructed,— and not merely with perfect immunity from punishment, but actually with the protection of the government, that protection being virtually the most complete for those whose ignorance is the greatest! This sacrifice of human life, be it further recollected, is constant and unceasing — not occasional only, or at long intervals, as that caused by epidemics, pestilences, and wars. — It was said, upwards of two hundred years ago, by a celebrated Archæologist (Sir H. SPELMAN), "that whilst every thing else had risen in nominal value in England, the life of man had become continually cheaper." What would he have said, had he lived in the present day?

241. The *means*, by which the indication or practical principle above contended for is to be fulfilled, must necessarily vary with the circumstances of the case; but the decoction of *cinchona*, or the infusions of *cascarilla* and of *gentian*, &c. with the *alkaline carbonates* (F. 381. 385. 387, 388. 445. 869.), are generally beneficial, especially when aided by warm aromatic tinctures or spirits. When the pulse is very quick, soft, and weak, and when the patient is physically and morally depressed, the *chlorate of potash*, *serpentaria*, or other stimulants, may be added to the above (F. 415—417. 437—439.). In these cases, *camphor* in full doses, the preparations of *ammonia*, and *capsicum*, or other spices and aromatics (F. 845. 852.), may likewise be prescribed. In all asthenic inflammations, the excretions, and the fluid effused in the diseased tissues, are more or less acid,—a state which is most readily corrected by the alkaline carbonates, conjoined with tonics and aperients. In many cases,

however, the preparations of *chlorine*, particularly the *hydrochloric acid*, the *hydrochloric æther*, and *chlorinated soda*, prescribed with tonic vegetable infusions or decoctions, and with camphor, aromatics, &c., are equally beneficial with the foregoing (F. 847, 848.).

242. *B.* But, in order to promote the powers of life, and thereby to enable the vessels of the diseased part to form coagulable lymph, whereby the progress of mischief may be arrested, it is necessary, not only to excite the organic nervous system, but also *to depurate and to correct the circulating fluids by appropriate medicines.* This intention will be fulfilled chiefly by promoting the excreting functions by mild *purgatives*, conjoined with *tonics* and *aromatics*, as the compound *infusions of gentian and senna* with the alkaline salts (F. 266.), the compound *decoction of aloes* with warm aromatic tinctures or spirits, or the infusions of *rhubarb* and *cinchona* (F. 55. 387. 433.), or other similar remedies (F. 53. 215, 216. 872.). In the intervals between the exhibition of these, tonics and stimulants should be selected, and given in doses and combinations suitably to the seat and urgency of the disease. If the purgatives just mentioned act insufficiently, a dose of oil of turpentine and castor oil (about half an ounce of each) may be taken on the surface of milk, or of any aromatic water (F. 216.), and enemata containing the same oils (F. 135. 151.) administered according to circumstances. If the biliary secretion be suppressed or interrupted, *calomel* or PLUMMER's pill may be given at bed-time, with *camphor;* and a draught containing the oils, or either of the above purgatives, may be taken in the morning. The combination of the mild alkaline salts, or of the chlorate and carbonate of soda (F. 439.), with the foregoing tonic or other medicines, will generally correct the circulating fluids, diminish the contaminating influence of the matter effused in the seat of disease, and further promote the fulfilment of the present indication.

243. *C.* From the commencement of the treatment, it is often requisite *to mitigate the more urgent local and constitutional symptoms.* — *a.* The remarkable pain and tumefaction of the inflamed part are best relieved by anodyne fomentations, by warm bread and water poultices, or by the local application of simple or medicated steam. In the more complete forms of asthenic inflammation, no advantage will accrue from the application of leeches to the inflamed part; although a recourse to incisions of the integuments, as recommended by Mr. A. COPLAND HUTCHISON, and others, will often be of service, when cellular and adipose parts are the seat of disease, and the tension is very great. I have seen also the application of a cloth moistened with oil of turpentine have a very remarkable effect both in mitigating the pain, and in lessening the tension and tumefaction. It should be applied warm, and covered with wash-leather or oil-skin to prevent evaporation and cold. In several cases, where the swelling has been most extensive, — the whole limb to the trunk having been affected, — I have seen it subside very quickly after a decided recourse to the internal and external treatment here recommended. In most of these cases, the tone of the vessels has been rapidly restored, congestion of them removed, and the effused fluid absorbed, without coagulable lymph having been formed, or suppuration having supervened, excepting in some instances at the point of injury, or where the disease originated. When this treatment is early resorted to, not only is the progress of the disease arrested, but also much of its more immediate effects is removed, without the lesser evil, the formation of fibrinous lymph, for which JOHN HUNTER contended, having taken place.

244. *b.* At advanced stages of asthenic phlegmasia, more frequently, and even at early periods occasionally, excessive *pain* and general *irritability* call for a prudent yet decided recourse to *narcotics.* In these cases, a lowering treatment will neither mitigate the pain nor diminish the other symptoms, but, on the contrary, increase them all, and render still more rapid the already quick and irritable pulse. Here *opium*, or the acetate or hydrochlorate of *morphia*, or *hyoscyamus*, in large doses, must be resorted to. But these ought always to be conjoined with *camphor* and some of the *aromatics* or *spices.* — When *delirium* appears in the course of asthenic inflammation, depressing remedies are generally injurious; but the narcotics just named, and combined as now advised, will be of the greatest benefit, particularly in conjunction with the restorative treatment above recommended, and after the excretions have been duly evacuated by appropriate means. — (See art. DELIRIUM.)

245. *c.* When asthenic inflammations are attended by general *vital depression without re-action* (§ 62.), the most energetic stimulants, tonics, and restoratives are necessary; and if delirium supervene, camphor, ammonia and opium, with warm aromatics, should be freely exhibited.

246. *d.* When organic nervous or *vital power is depressed, although much general vascular excitement exists* (§ 63.), the pulse being rapid and weak, similar means to the above are requisite, but in less energetic doses. Camphor, with the narcotics already advised and aromatic spices, mild stomachic purgatives, occasionally aided by a draught and an enema containing turpentine and castor oils, are also most efficient remedies.

247. *e.* In cases characterised by *depressed vital power, acute nervous sensibility, and cerebral disorder* (§ 64.), the means just recommended are urgently called for; but the narcotics and camphor should be prescribed at an early period of the disease, and in large doses. The effusion of tepid or warm water on the head, according to the temperature of the part, may be employed. Medicated vapour or warm baths may also be tried, and medicated steam (§ 232.) may likewise be applied to the local malady.

248. *f.* When there are *excessive irritability, acute pain, and vascular excitement* (§ 65.), the internal and external treatment just prescribed, but modified according to the stage and particular features of the disease; a combination of camphor calomel, and opium; stomachic aperients, with the alkaline salts, and an occasional recourse to turpentine and castor oil, in the form of draught or enema; are chiefly to be relied upon.

249. *g.* Great *irritability of stomach* may occur at an earlier or later period of asthenic inflammations, when attended by any of the forms of constitutional commotion just referred to. When this is the case, every endeavour must be used to allay it. Warm aromatics, or spices and stimulants, with small doses of opium, will generally have this effect in the less urgent cases; par-

ticularly when aided by the assiduous application of the warm turpentine epithem over the region of the stomach, and by the administration of stimulant and antispasmodic enemata. In such circumstances, those articles which are most grateful to the stomach should be selected, and every thing of a depressing nature avoided. Effervescing medicines are seldom useful, especially if this very unfavourable symptom occur at an advanced period of the disease. More advantage will accrue from small and frequent doses of ammonia, camphor, capsicum, and other warm aromatics or stimulants, — from small quantities of burnt brandy, — from strong and highly spiced negus, — and from other restoratives of small bulk, — than from cold relaxing fluids. I have seen much benefit derived in these cases from moderate doses of créasote, or of cajuput oil, in suitable vehicles, or in the form of pills made with any absorbent substance.

250. *h.* When disorganisation of the inflamed part has commenced, or is advanced, *local means* of an energetic kind may be prescribed if they can reach the part in any way; if they cannot, the constitutional treatment, aided by suitable diet and regimen (§ 260.), and by a pure, dry air, must be energetically but carefully enforced. As to the topical applications which may be prescribed in these circumstances, some incidental observations have been already offered; but it may be further stated, that those substances which *constringe* or *impart tone* to the affected vessels and tissues should be employed, and that those which possess this as well as an *antiseptic property* in the most marked degree, should be preferred. Strong décoctions or infusions of cinchona, or oak barks, the terebinthinates, the solution of chlorinated soda, or of the chlorate of potash, or of the chloride of lime, or créasote, may be severally employed in the form of either lotion or injection, or on the surface of warm poultices, or in any other mode more appropriate to the peculiarities of the case.

251. *i.* During the treatment, especially of the advanced stages of asthenic phlegmasia, the *absorption of the morbid matter* from the seat of disease, into the circulating fluids, ought to be prevented by every possible means. This object can be obtained only by giving a free exit to whatever of this matter may have accumulated, and by preventing any collection of it from taking place. The internal treatment, which I have advised, will also have a most decided influence in preventing the absorption of it, and will enable the powers of life to resist whatever morbid impressions it may make in the seat of disease. The marked influences of all depressing agents in promoting the absorption of morbid fluids, and the powers of tonic and restorative means in preventing absorption, and the consequent contamination of the circulating fluids, as well as in enabling the constitution to resist the natural tendencies of these fluids and to throw them out of the œconomy, have been fully shown in the articles Absorption (§ 15. *et seq.*), Abscess (§ 62.), Blood (§ 143. 157. *et seq.*), Cellular Tissue (§ 35, 36.), and Veins — *Inflammation of.* The constitutional and local treatment fully described when discussing *Typhoid* and *Putro-adynamic* Fevers, *Diffusive Inflammation of the* Cellular Tissue, and Gangrene, is generally suitable to asthenic inflammations.

252. iii. Treatment of Inflammations intermediate between the Sthenic and Asthenic, &c. — Although inflammations generally present characters belonging more especially to the sthenic or asthenic forms, yet they occasionally present features appertaining to both, and consequently they require a somewhat different or modified treatment from what has been here assigned to each of the principal forms. Like all febrile diseases, inflammations also change their types and characters, under the influence of *climate, season,* and *epidemic constitution;* and hence, at particular periods, they not only present *sthenic* or *asthenic forms,* but also *transition,* or *intermediate, states.* Nor ought it to be forgotten, that these transition or intermediate states, as well as the more truly asthenic forms, are either so dependent upon, or associated with, certain conditions or affections of the constitution, — often of the organic nervous and circulating systems, — as to impart to the local malady many of its peculiar features. This is very manifestly shown in those inflammations which I have denominated *specific,* as arising from certain specific, or infectious, or poisonous causes, — in *erysipelas, puerperal inflammations, dysentery, small-pox, scarlatina, measles, syphilis,* &c.

253. *A.* Nor should it be overlooked, particularly in the treatment, that numerous morbid impressions made upon the œconomy, more especially by *epidemic constitution* and by *terrestrial exhalations,* modify remarkably all inflammations, and deflect them more or less from the sthenic type, to which I have sufficiently directed attention. These influences, therefore, however operating, must always be kept in view, in connection with other predisposing and exciting causes. The prevailing epidemic constitution is often sufficiently evident in its effects, however obscure in its origin and nature. The attentive observer will seldom fail of recognising it, even in its earlier appearances, particularly if the circumstances, to which I have already alluded (§ 191.), be observed.

254. *B.* The influence of *malaria* or of *terrestrial emanations* on inflammations is also important, although it is less observable in this country than in many others. In the southern countries of Europe, Asia, and America, and in many intertropical regions, malaria, by its effects upon the constitution, imparts to inflammation more or less of an asthenic or adynamic character, accelerating its course, or rendering its consequences most serious. In the less intense forms of inflammation, and particularly in their more chronic forms, the constitutional affection assumes either a *remittent* or *intermittent type.* In the former case, the influence of the paludal effluvia is often overlooked, or insufficiently estimated: in the latter, the local affection too frequently escapes detection, or is even never inquired after, the form of the attendant fever alone attracting notice.

255. *C.* In the *white races* of the species, and in the inhabitants especially of northern and temperate regions, the sthenic form of inflammation, and those states of the disease which more nearly approach it, most frequently occur. But in the *black* and *dark-skinned races,* inflammations either assume, or rapidly pass into, more or less asthenic forms. The mode of living is another circumstance which should be viewed in connection with the variety of species in which these diseases may occur, and which is of equal importance with it,

in the treatment of this class of maladies. Owing to the peculiarity of organisation possessed by the dark races, and to the forms which inflammations consequently assume in them, vascular depletions and other evacuations more readily exhaust the vital or constitutional powers, and are much less beneficial in the treatment of these diseases, than in the white races. Hence they should be most cautiously employed in these former varieties of the species, even although the phlegmasia may present, at its commencement, a predominance of the sthenic characters; and when it appears in an unequivocally asthenic form, means energetically tonic and restorative are especially requisite.

256. *D.* Much of this intolerance of depletions and lowering remedies, in the treatment of the inflammatory diseases of the dark races, may be attributed to their low or *abstemious diet*, and to their living chiefly on *farinaceous substances.* Although the constitution and modes of living of these races thus impart a certain character to many of their maladies, and especially to those under consideration, yet they also bestow upon them a much greater immunity from inflammations, than is possessed by the white and more highly fed variety of the species. Persons who live chiefly on animal food, and particularly on simply dressed or underdone meats, are much more liable to sthenic inflammations, and require much more copious depletions and alvine evacuations for their cure, than those who use vegetable food, or animal substances which have undergone great changes by elaborate or repeated cookery.

257. As these states of inflammation, which may be viewed as intermediate between positively sthenic and asthenic conditions, vary with these and other circumstances, so the treatment must necessarily be varied accordingly: but the several respects, in which variations should be made, cannot be stated with precision; they ought to be adopted conformably with the deductions, as to existing pathological conditions — local and constitutional — formed by the practitioner at the time of prescribing for them. Every thing must depend upon his pathological knowledge and acumen, and upon his practical resources, appropriately applied to each case.

258. *E.* The treatment of *specific inflammations* and associations of the phlegmasia with other maladies implicating the constitution or the principal viscera, especially those just named (§ 252.), requires no remark at this place. They present every intermediate feature between the sthenic and asthenic forms above described, according to the constitution and age of the patient, and to external or internal agents, existing epidemic constitution, and other circumstances by which his frame may have been, or is at the time, influenced; and they consequently require an application of the principles of practice, as well as appropriation of individual means, conformable thereto. But these topics will be found as fully discussed as the nature of the subject will permit, in the articles devoted to these *specific inflammations,* as well as in those on Dysentery, Erysipelas, *the Complications of continued* Fevers, &c.

259. iv. *The treatment applicable to* the Consequences *of the different forms of inflammation,* either has already been noticed in the foregoing observations, or has been fully considered in the separate articles devoted to the chief of these consequences, particularly Abscess, Gangrene, Induration, Softening, &c.

260. v. The Diet and Regimen ought to be strictly *antiphlogistic*, in the *sthenic forms* of phlegmasia. The *food* taken in the slighter and more chronic cases should be mild, farinaceous, and in small quantity. The *beverages* or *drink* ought also to be cooling and diluent (F. 588. *et seq.*). Perfect quietude of body and mind should be enforced, as tending most materially to keep down vascular action, to prevent the exhaustion of vital power, and to promote the operation of the medicines employed.

261. When inflammation assumes, or passes into, an *asthenic form*, it will be necessary to support the powers of life by a restorative diet and regimen, as well as by the medical treatment recommended (§ 236. *et seq.*). But in such cases, the digestive organs are always remarkably weak, are incapable of assimilating much food, and are readily disordered by whatever is difficult of digestion. The stomach should therefore be kept in humour, by allowing that only to be taken which is craved for or most relished. Generally, in the more asthenic cases, small quantities of warm or highly seasoned soups or broths, as beef-tea, gravy, or Mulligatawny soup, with boiled rice, &c., warm jellies, with old sherry, and similar articles, may be taken. If vital depression be great, warm and highly spiced negus, or mulled wines, and even champagne, may be freely allowed. In many instances, when there is much thirst, brisk bottled stout, seltzer-water with wine or milk, spruce or ginger beer, &c., may be given, and may even be made the vehicle of warm restorative medicines; but they ought not to be given until their temperature is raised somewhat above that of the surrounding air, nor should they be taken in too large a quantity at one time. In this form of inflammation especially, the patient should respire a mild, dry, and pure air. The varying phases of the disease — local and constitutional — ought to be carefully observed throughout; and whatever may occur of an unfavourable character, instantly met by energetic means.

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INFLUENZA. — Syn. Epidemic Catarrh. *Influenza* (Influence), *Rheuma Epidemicum*, Sauvages. *Catarrhus Epidemicus*, Swediaur, Good. *Febris Catarrhalis Epidemica*, Huxham. *Synochus Catarrhalis*, *Morbus Catarrhalis*, Ehrmann. *Catarrhus a Contagio*, Cullen. *Febris Remittens Catarrhalis*, Macbride. *Defluxio Catarrhalis*, Young. *Catarrhe Pulmonaire*, Pinel. *Fièvre Catarrhale Epidémique*, *Grippe*, Fr. *Die Russische Krankheit*, *R. Katarrh*, *Influenz*, *Blitzkatarrh*, *Epidemischer Schnupfenfieber*, Germ. *Snufsjuka*, Swed. *Catarrho Russo*, Ital.

Classif. — 1. *Class*, Febrile Diseases; 5. *Order*, Fluxes (*Cullen*). 3. *Class*, Sanguineous Function; 2. *Order*, Inflammations (*Good*). III. Class, II. Order (*Author*, see *Preface*).

1. Defin. *Lassitude; pains in the head, loins, or limbs; chills, horripilations and coryza, followed by cough, by defluxions from the respiratory passages, by fever of a nervous or adynamic character and by anxiety at the præcordia, or pains about the margins of the ribs; the disease attacking a number of persons at the same time, and often passing into asthenic inflammation of the respiratory surfaces or organs.*

2. I. History.—*Influenza*, or *Epidemic Catarrhal Fever*, has been noticed by many medical writers since the revival of learning in Europe; and, although presenting on all occasions the same general features, yet it has assumed somewhat varied characters with the several circumstances connected with its appearances. The seasons, the weather preceding or during its visitations, the climate, and the locality, have, doubtless, slightly modified some of its phenomena; yet it has generally presented nearly similar features in very different seasons and situations. Indeed, whatever diversity may have existed in its several visitations, has been referrible rather to the epidemic itself than to other causes.

3. The earliest recorded occurrences of influenza were in the years 1239, in 1311, 1323, 1327, 1358, 1387, and 1403. Valesco of Tarentum was a witness of that of 1387; and he remarks respecting it, that scarcely one tenth of the population escaped the disease, the aged chiefly dying of it, and rheumatic affections often following it. The most successful means of cure consisted of pectoral decoctions and sudorifics. It appeared again in 1411, 1414, 1427, and 1438. Carli, the historian of Verona, describes this last to have been general throughout Italy, and fatal to the aged and to young children. Mezerey, the French historian, notices the prevalence of influenza in France, in 1482. Torrella, in his history of Italy, states that an epidemic catarrh prevailed throughout Italy and Spain in 1505, "qui paucis pepercit, senibus maxime, cum raucedine, gravedine, molestâ tussi, destillationibusque per superiora, comitante febri."—The historian De Thou mentions the appearance of a similar epidemic in 1510; and Sennert remarks respecting it — "in omnes ferè mundi regiones debacchata, cum febre, summâ capitis gravitate, cordis pulmonumque angustiâ atque tussi; quanquam multò plures attigit quàm jugulavit." (*De Abd. Caus. Rer.* lib. ii. cap. 12.) A similar epidemic pervaded Europe in 1557, and is described by Riverius, Schenck, and others. It presented the same symptoms as those observed in the recent visitations of the disease. Mercatus (*De Int. Morb. Cur.* lib. i. c. 43.) observes, that the Spanish physicians were greatly perplexed as to the treatment of this epidemic, for bloodletting and purging were of no service, but even injurious in many cases; and Valleriola (*Soc. Med. Comm. Append.* cap. ii.) states that it possessed the same characters in France — bleeding and purging being injurious, but demulcents and expectorants beneficial. The epidemic of 1578, described by Ballonius or Baillou, and which has been noticed by Ozanam and others as influenza, was evidently hooping-cough — inasmuch as it attacked children chiefly, and as the paroxysms of cough, which occurred at considerable intervals, were attended by vomiting of large quantities of a glairy fluid. That, however, which occurred two years later (in 1580), was certainly influenza. Mercatus describes not only the catarrhal symptoms, but also the pains in the head, back, limbs, and about the false ribs, usually attending this disease. He observes that bloodletting was often fatal — "Quo profectò, factum fuit, ut plures interficerent imprudentes et imperiti medici quàm mali sævitia et inclementia." Sennert (*Opera*, lib. iv. c. 17.) remarks of this epidemic, that, although generally prevalent in Europe, but few died of it, excepting those who were the subjects of old pectoral or visceral diseases, or who were improperly blooded. Similar observations are offered by Wier, Zacutus Lusitanus, Campana, Riverius, &c., who state that this epidemic prevailed over the whole globe, and in Europe, chiefly in April and May. Forestus prescribed a small bloodletting at the commencement of the disease, but confined this practice to the young, strong, and plethoric.

4. The epidemics of 1596, 1597, and 1617 offer nothing worthy of remark. That of 1627 was altogether the same as the one just noticed. The influenza of 1658 is fully described by Willis, as he observed it in London, in April, May, and June. Many aged, infirm, and delicate persons were cut off by it; pulmonary congestions, bronchitis, and pneumonia having manifestly,

from his description, been complicated with it. He treated it by moderate bloodletting, in the young and robust, and by diaphoretics and pectoral medicines. The slighter cases recovered spontaneously after a copious perspiration. This disease appeared again in Continental Europe in 1663.— Bartholin, Sylvius de la Boe, and Ettmüller describe the epidemic of the summer of 1669 to have appeared after a severe spring, and variable weather at the beginning of summer. They employed chiefly sudorifics and pectoral medicines in its cure.

5. The epidemic catarrh of the autumn of 1675 was general throughout Europe. Rayger and Peu state that it appeared after a very rainy summer, and that it was preceded by thick mists and fogs, and inconstant weather. Puerperal females in many cases aborted, and others suffered menorrhagia. When the loss of blood was considerable, dropsy, debility, and prolonged convalescence ensued. This epidemic did not prevail in England until the following year. It is described by Sydenham and Ettmüller. The disease commenced with pains in the head, loins, and limbs, with great prostration of strength, cough, pains in the sides and points of the ribs, and occasionally bloody expectoration. Sydenham remarks that the pulmonary affections were merely symptoms of the epidemic aggravated by the cough, and sometimes by a too stimulating treatment and regimen. He viewed the disease as resulting from the action of a cold humid air upon the skin; the fluid secreted by this emunctory being thrown in upon the system, and exciting fever, cough, and disease of the lungs. He directed his treatment chiefly to the fever, and prescribed moderate bloodletting, diaphoretics, laxatives, diluents, and emollients. Large depletions were injurious; and evacuations prolonged the complaint in hypochondriacs and in hysterical females, and rendered the convalescence tedious. Of the less extensive epidemics of 1691, 1695, and 1699, it is unnecessary to take any notice; and those which appeared early in the eighteenth century need only to be slightly mentioned.

6. The influenza of 1729 and 1730 appeared after severe and changeable weather at the beginning of 1729; and traversed the whole of Europe during summer, autumn, and the commencement of winter. It varied in its general characters and complications in different countries, and at different seasons. It was frequently not ushered in by chills or rigors, but by lassitude, depression, headach, pains in the loins and limbs, oppression at the chest, anxiety or pain in the epigastrium, coryza, severe cough, sore-throat, and heat of skin, the pulse being quick and irregular. Swellings of the parotids, or of the tonsils, were not infrequent; and the pulse was often remarkably small and weak. In other cases, horripilations, vertigo, and rigors ushered in the disease, which sometimes assumed a severe character, — delirium frequently supervening. The most violent cases occurred in low, humid, close, or miasmatous localities, and were complicated with pneumonia, pleuro-pneumonia, or with bronchitis; and the fever, in these situations especially, presented somewhat of an adynamic or malignant character. When the complaint was simple, it often terminated from the fourth to the seventh day by epistaxis, or by a slight expectoration of blood, or by the hæmorrhoidal or menstrual flux. In the more complicated cases, congestions of the brain or lungs, and dropsy of the chest, frequently occurred; chronic bronchitis, consumptions, and various other diseases appearing as their sequelæ. It was most dangerous to the aged, and to those who had previous disorder of the respiratory organs. The treatment consisted chiefly of a moderate bloodletting at the commencement of the disease, in the young, strong, and plethoric, in pregnant females, and in the complications with congestion of the brain, or with inflammation of the lungs or pleura; of diaphoretics, diluents, and diuretics; and of mild purgatives followed by anodynes, demulcents, and emollients. (Hoffmann, Beccaria, Morgagni, &c.)

7. The catarrhal epidemic of 1733 appeared in some countries as early as the preceding December, and in some places assumed a more inflammatory character than in others. The head was frequently affected, and hæmorrhages from the respiratory surfaces sometimes occurred. Children and young persons were more frequently attacked than in the influenza of 1729; but the aged, and those already the subjects of visceral disorder, were most severely and dangerously seized. The plethoric and sanguine often presented inflammations of the throat and lungs; and the bilious experienced severe pains in different parts. The intemperate suffered greatly from gastric disorder. Dropsy of the chest often supervened at an advanced stage, or as a sequela of the disease. Bloodletting was injurious, unless in the complications with pneumonia, or pleuro-pneumonia; and even in these it often proved hurtful, when carried too far, or exclusively trusted to. Emetics, mild purgatives, diaphoretics, and demulcents, with diuretics, and afterwards tonics and antispasmodics, were found most generally useful. The same epidemic, as it occurred in the South of England, was described by Huxham, who notices the disposition to perspiration, which appeared about the second or third day and abated the fever, proving a crisis to it about the fourth in the milder cases. He found emetics of great benefit, when there was nausea or biliary disorder. After bleeding, in the pulmonary complications, he prescribed expectorants. His treatment, in other respects, was similar to that already mentioned.

8. Huxham has described the influenza of 1737 to have commenced with chills, headach, coryza, repeated sneezing, and pains in the face, loins, or limbs. Copious defluxions from the nostrils and respiratory passages, severe cough, difficult expectoration, oppression at the præcordia, &c., generally followed. Sore-throats, swellings of the parotids or submaxillary glands, severe pains in various parts, and sciatica were often also complained of — the symptoms varying much with individual constitution, &c. — Many experienced only slight febrile disturbance, which terminated in a moderate sweat; and in others the disease passed into a dangerous peripneumony; and the severer cases were generally followed by great prostration of strength, by consumption, pains in the limbs, or obstinate rheumatism. The treatment was nearly the same as that employed by him in the preceding epidemic; but he found that bloodletting could be carried somewhat further than in it, particularly in the complicated cases. Blisters, diaphoretics, and expectorants were generally pre-

scribed. For the removal of the rheumatism which followed this disease, he employed calomel with purgatives and antimonials.

9. The catarrhal fever of 1742 followed a most severe winter; north-east winds having prevailed for nearly five months. Its characters, were in no respects different from most of the epidemics already noticed. The most severe cases presented signs of adynamia, or even of malignancy, particularly in the aged, debilitated, cachectic, or previously diseased. In the simple form of the distemper, bloodletting and evacuations were injurious; and diaphoretics, expectorants, and diuretics were beneficial, in this and in other forms. But, when the respiratory organs became inflamed, vascular depletion, cautiously employed, was requisite, particularly early in the disease. In this epidemic, paregorics, oxymel of squills, and a gentle emetic at the commencement of the complaint, or immediately after the bleeding, when this was required, were generally employed by HUXHAM, SAUVAGES, and others.

10. The epidemic of 1762 pervaded nearly the whole of Europe, between the months of February and July. Descriptions of it have been left by DE MAERTENS, BAKER, GILCHRIST, WATSON, and others. It proved very fatal to the aged, the asthmatic, and previously diseased; and pregnant females often suffered abortion or premature labour when attacked by it. GILCHRIST, with much justice, viewed this, as well as other epidemics of the same kind, as a fever, *sui generis*, attended by catarrhal symptoms. The course, complications, consequences, and treatment of this influenza differed in nothing from those which preceded and followed it.

11. The catarrhal epidemic of 1775 pervaded Europe, and, like several visitations of the same kind, was not confined to the human species, but affected also the lower animals — often commencing with them. It broke out during a dry and warm summer, following a mild and very dry spring. This was the first epidemic that received the name of *influenza*, it having been generally imputed in Italy to a peculiar aërial influence. It commenced with reiterated chills, lassitude, coryza, sneezings, headach, and wandering pains in the chest, loins, and limbs, followed by fever with incessant cough, copious defluxion, sore-throat, hot skin, a quick soft pulse, pale turbid urine, and vertigo or slight delirium. About the third or fourth day, copious perspiration, hypostatic urine, and free bilious evacuations often took place, and proved critical. It required the same treatment as other preceding epidemics; and when neglected, often passed into asthma, chronic bronchitis, and consumption.

12. Of the epidemic catarrhs, which have occurred from 1775 to 1833 — namely, in 1782, 1789, and 1803 — I shall notice only that of 1782. It appeared in Great Britain between the end of April and the middle of June, and attacked about four fifths of the population. It was least prevalent and mildest in children. It was most severe in the aged, the asthmatic, and the previously debilitated or diseased; and, except these, but few died of it. Like other epidemics of this kind, it seldom continued longer than six weeks in a place. The treatment was similar to that adopted on former occasions. Bleeding was required only when symptoms of pleuritis or pneumonia appeared. Gentle emetics and mild purgatives were useful early in the disease — the former chiefly when the expectoration was difficult. When the expectoration was too profuse, bark or other tonics were required. Where the cough continued long and obstinate, opiates and change of air were most serviceable.

13. From the foregoing brief epitome of some of the most remarkable epidemic catarrhal fevers upon record, it will be observed, that they have been all essentially the same in character, and that they required the same principles of treatment. Certain differences, however, existed, not only in those of which I have made mention, but also in most of those to which I have thought it unnecessary to refer. In some, an inflammatory diathesis seemed more apparent than in others; but when inflammatory complications occurred, they always presented more or less of the asthenic diathesis; or the accompanying, and indeed the primary, fever presented more of a nervous or adynamic, than of an inflammatory form. The constitutional disturbance generally preceded the inflammatory complications; such complications arising out of predisposition, of previous disorder, or of accessary causes. In some epidemics, children and young persons were more affected than in others: but in all, the aged, the asthmatic, the debilitated, and those subject to disorders of the respiratory organs were most seriously attacked. Although the disease was most prevalent between the ages of fifteen and fifty, as in most other epidemic fevers, yet it was least dangerous or fatal at this period. Some of the epidemics differed from others in the presence or severity of the pains in the head, chest, back, or limbs. In some, particularly, the pains assumed the form of a rheumatic complication, which continued after the febrile and catarrhal symptoms had been removed; in others, they seemed to depend upon biliary colluvies, or collections of morbid bile in the biliary apparatus. In some, also, the complication was very generally bronchitis, or pneumonia, or pleuro-pneumonia — whilst in many, sore-throat, with or without swelling of the adjoining glands, or gastric disorder, was more or less evident. Lastly, some epidemics, although almost universal, were comparatively mild; and others were both severe and fatal; the fatality proceeding chiefly from the severity, or extent of the complications, and from previous disease.

14. The *sequelæ* of the several epidemic catarrhal fevers, of which any satisfactory accounts have been left to us, were nearly the same as observed in recent times. These consisted chiefly of chronic bronchitis; of pulmonary consumption; of hæmoptysis; of serous effusion in the thoracic cavities, consequent upon congestions of the lungs, or of asthenic inflammation of the serous surfaces in this cavity; of rheumatic and neuralgic affections in various parts; and of functional disorder of the digestive and assimilating organs. — In some of the epidemics, and in that of 1837, sciatica was a not infrequent remote sequela of the disease. The *treatment* which was found most appropriate in former epidemics will be further referred to hereafter.

15. II. SYMPTOMS OF INFLUENZA. — The account which I shall give of influenza is derived from an extensive observation of its pathology and treatment during the epidemics of 1833 and 1837

—the two most severe visitations of the disease in this country upon record, and especially in London. In both these the distemper was either *simple* or *complicated.*—*A. The simple form* of influenza, was most frequent in the young and middle-aged, and the previously healthy; and usually commenced with chilliness, rigors or horripilations, lassitude, general depression or anxiety, gravedo and headach, followed in some hours by heat of skin, coryza, sneezing, fulness and tenderness of the eyes, soreness of the throat, hoarseness, cough, pain of the back and limbs, loss of sleep, and considerable fever. The cough was generally attended by more or less soreness of the chest, hurried respiration, slight dyspnœa, either pain or a tenderness and bruised sensation at the diaphragmatic margins of the ribs and epigastrium, and wandering pains in the trunk, especially about the sides. Nausea, loss of appetite, sometimes vomiting, costiveness, seldom diarrhœa, and a white, slightly coated, or mucous appearance of the tongue, were also present. These symptoms continued for 24, 36, or 48 hours; the cough being dry, and aggravating the sense of soreness, and the pains about the chest. Afterwards expectoration became more abundant and easy; the skin softer and moister; and the pain of the head or about the frontal sinuses, and in the chest, back, or limbs, less severe. The pulse was generally quick, sometimes a little sharp, usually soft and weak: but it was often irregular, or very changeable and uncertain. As the symptoms became mitigated, about the third, fourth, or fifth day, the perspiration became more abundant, and the urine deposited a copious sediment: yet the cough frequently continued severe and obstinate, and the consequent debility was much greater and more prolonged than the severity or duration of the disease seemed to warrant. In the more severe cases, these symptoms were generally very prominent, and the febrile phenomena fully developed, transient delirium even occurring; but in the slighter cases, several of them were not very remarkable. In this form of the disease, the chest sounded clear upon percussion, and respiration was clear and vesicular, no morbid râle being heard on auscultation; but, as the complaint proceeded, a slight mucous râle was sometimes present.

16. *B.* The COMPLICATIONS, or prominent affections of influenza, were chiefly — (*a*) a peculiar inflammatory condition of the throat and pharynx; (*b*) severe gastric disorder;— (*c*) bronchitis;— (*d*) a specific pneumonia, or pleuro-pneumonia; — (*e*) tubercular phthisis;—(*f*) a form of pleuritis;—(*g*) rheumatism; — (*h*) disease of the heart and pericardium; — and, (*i*) severe adynamic or nervous fever. The frequency of the occurrence of these affections in a predominant form was nearly in the order in which I have enumerated them.— *a.* The *inflammatory state of the throat and pharynx* was very frequent, but sometimes slight. It was always of what has been usually termed an erythematic or erysipelatous kind, but more correctly asthenic or spreading; and attended, as it proceeded, by more or less of a fluid discharge, which served to increase the quantity of matter thrown off at each fit of cough. In the severer cases, this state of inflammatory irritation was accompanied with some swelling; and in many cases, the affections of the bronchi, and of the upper portion of the digestive mucous surface, seemed only the extension of the disorder of the throat and pharynx to these parts. This affection of the throat generally subsided in two or three, or at most five or six, days, after a more or less copious discharge from the affected surface, and sometimes after the extension of disease to the gastric or bronchial surfaces — or rather, after the disorder of the latter had become more manifest.

17. *b. Severe gastric disorder* was indicated by soreness and tenderness at the epigastrium and under the lower end of the sternum, and by nausea and vomiting, sometimes with thirst. It was often very early observed; and when it and the preceding affection were present in the same case, — which was not infrequent, — it was difficult to determine which had been the first to appear, or whether they were coetaneous in origin. Indeed, they seemed often to have been prominent local manifestations of the constitutional disease, arising nearly at the same time. Although rendering the disease more or less severe, increasing the debility and general depression, and prolonging convalescence, the gastric complication was never fatal, or even dangerous. It was sometimes associated with considerable derangement of the biliary functions and secretion, with slight costiveness, and in some cases with diarrhœa; the irritation in these latter having seemed to extend along the digestive mucous surface.

18. *c. Bronchitis* was one of the most frequent and severe complications observed in the last two epidemics, especially in that of 1837. But it was different from the acute sthenic bronchitis usually observed as a primary disease, or as occurring in previously healthy persons. It was attended in many cases with more marked vital depression, with a more copious expectoration of a greyish, viscid, ropy, and less frothy mucus, which often quickly passed into a thin muco-puriform matter, than in idiopathic bronchitis. In most of the cases, both lungs were more or less affected, and the disease seemed rapidly to extend along the larger bronchi to the smaller ramifications, until, in the dangerous or fatal cases, the air-cells themselves became implicated. At the commencement of the bronchial complication, the cough was hard, dry, and severe; but expectoration soon became abundant, — the wheezing from the accumulation of the morbid secretion in the bronchi being often remarkably loud. The cough and the quantity of the sputa were generally increased at night, the former being frequently so severe, and the attendant dyspnœa so urgent, as to prevent the patient from lying down. When both lungs were gravely affected, the patient was obliged to sit or be shored up by pillows. In some cases, the sputa were remarkably abundant, consisting of a very fluid muco-puriform matter, almost from the commencement. In most of the bronchial complications, the *dyspnœa* was considerable, and especially when expectoration was difficult and the sputa copious; still it was often great when the discharge from the respiratory passages was neither abundant nor difficult. The rapid extension of this asthenic form of bronchitis throughout the lungs was most remarkable in the delicate, the aged, the cachectic, and those subject to asthmatic or bronchial disorder. In some instances it quickly superinduced a nervous or asthenic form of pneumonia or pleuro-pneumonia, with which it

further became associated; and occasionally it seemed to have given rise to more or less emphysema of the lungs. The mucous, or the crepito-mucous, rhonchus was generally heard in most of these cases. The pulse was usually upwards of 100, often above 110, and irregular. The severer forms of this complication often terminated fatally, owing to the quantity of the morbid secretion filling the smaller bronchial ramifications, infiltrating the air-cells or even the areolæ of the connecting cellular tissue, and thus occasioning asphyxia.

19. *d*. The *pneumonia*, or pleuro-pneumonia, with which influenza was often associated, was generally of a nervous or an asthenic form. It was either an early complication, or was consequent upon the bronchitic affection. It was indicated by oppression, weight, and anxiety in the chest; by difficult or anxious, breathing; by a crepitous, or crepito-mucous, rhonchus in the vicinity of parts where neither the respiratory murmur nor any morbid sound was heard, and where more or less dulness existed on percussion. The sputa were muco-puriform, distinct, copious, and but rarely bloody or rusty. This complication was always severe, was often further associated with bronchitis, and, in these cases, the patient could not lie on either side, but required to be propped up in bed. The changes observed in the lungs after death were different from those usually consequent upon idiopathic pneumonia (§ 32, 33.).

20. *e. Tubercular phthisis* was generally aggravated by the influenza; and was not infrequently called into existence by it, where the predisposition already existed, or where the tubercles were in a latent or crude state. In some instances, the subsequent stages of consumption were accelerated by it; but few cases terminated fatally during the epidemic seizure, unless at a far advanced stage of the tubercular formations, and then evidence of extensive bronchial disease was generally furnished both during the attack, and upon examination after death. Yet I met with instances of persons in far advanced phthisis, who either experienced comparatively slight attacks of influenza, or had not their malady greatly aggravated, or its course materially accelerated, by the epidemic.— Much of this seemed owing to the treatment pursued in these cases.—The complication of influenza with phthisis was not, in my practice, more frequently attended by *hæmoptysis*, than it is in other circumstances; although hæmoptysis was frequent in phthisis, subsequent to, or developed by, the epidemic malady.

21. *f*. *Pleuritis* was not a frequent complication, unless connected with pneumonia; but when it occurred, its characters were much modified by the primary epidemic distemper. It generally appeared insidiously, the pains attending it having been often mistaken for the pains of the chest and vicinity usually attending the severe cases of the epidemic; and the latter having often masked the former. In some instances, effusion from the affected surface had proceeded far, before the existence of inflammation was suspected; the matter effused, instead of having consisted more or less of fibrinous or coagulable lymph, as in the sthenic forms of phlegmasia, having generally been fluid, turbid, sero-albuminous, or sero-puriform, and abundant. Hence adhesions of the opposite surfaces were never produced by the pleuritis complicating influenza, although old adhesions were frequently found upon dissection of fatal cases. In rare instances, not only pleuritis, but also pericarditis of a similar character, co-existed with influenza.

22. *g. Rheumatic affections* were seldom observed, even in those subject to them, during the epidemic malady; but they more frequently occurred subsequently, as sequelæ. The wandering, and sometimes severe, pains, characterising influenza, could not be viewed in the light of a rheumatic complication. When rheumatism appeared, it was generally obstinate, and, unless very appropriately and energetically treated, aggravated and prolonged the disease, and protracted convalescence.

23. *h. The complication with disease of the heart or pericardium* was observed chiefly in persons who were previously the subjects of such disease. A form, however, of asthenic pericarditis was met with in rare instances, either alone, or in conjunction with pleuro-pneumonia or pleuritis. But, in such cases, the inflammation gave rise to a similar effusion to that observed in the associated pleuritis already noticed (§ 21.).

24. *i*. In some cases, influenza assumed so severe a character, as nearly to approach *low nervous* or *adynamic fever*, owing to the great depression of organic nervous power, and the delirium and other cerebral symptoms attending it. Yet the disease was very different from these states of fever; and chiefly as regarded the catarrhal or bronchial symptoms, the sharpness or acuteness of the attack at the commencement, the free and general perspirations early in its course, the less loaded and more moist states of the tongue, the pale and turbid condition of the urine, the less complete loss of muscular power, and the much shorter duration of the febrile phenomena, when appropriately treated, in the former malady.

25. *k*. Some other complications were observed, particularly *laryngeal, croupy*, or *tracheal irritation*, of various grades of severity, but generally of a similar character to the bronchial affection already noticed (§ 18.), with which these were usually associated. They were seldom, however, met with, as the only, or even as the most prominent, complication. In slight forms, causing, at first, more or less hoarseness, and a harsh, clanging, and dry cough, and, subsequently, a convulsive or strangulating cough, with difficult expectoration and viscid sputa, these affections were very common; and were often either a part, or the commencement, of the phlegmasia which extended from the throat to the bronchial ramifications,— the larynx and trachea presenting, in fatal cases, similar appearances to those seen in the bronchi and pharynx.

26. These were the chief local affections which complicated the last two epidemic catarrhal fevers, and rendered them severe and often fatal. Some of them, it will be seen, were antecedent disorders, not only rendering more violent the epidemic attack, but themselves becoming, in turn, more developed and aggravated by the constitutional disease. Others, again, were evidently called into existence by the epidemic malady, owing to latent predisposition, or to various concurring or accessory causes. Very generally, however, influenza did not supervene upon acute visceral or febrile disease, until the latter was subdued, or

the patient was convalescent. Thus, I saw several patients with bronchitis, pneumonia, &c., near the end of December, 1836, just before influenza had appeared; and, although the epidemic prevailed in the same family during the acme and subsidence of these diseases, it did not attack these persons, until convalescence had either commenced, or had made considerable progress. It was generally severe in such cases, — the constitutional and local affections presenting an asthenic character; but recovery took place in all.

27. *C. Exacerbations* or *relapses* of the disease were sometimes observed after premature exposures and errors of diet; but the relapses were not always more severe than the primary affection; and so rarely occurred, if once the patient was truly convalescent, that they were rather exacerbations, or prolongations, of the disease, in consequence of a superinduced complication, or the production of renewed bronchial irritation. Many of the affections, which were viewed as relapses, were cases of bronchitis or of tracheal irritation, caused by cold during convalescence, and increased or modified by existing disorder of the digestive canal and of the biliary organs, and by debility.

28. *D. Certain of the symptoms* require a brief notice. — The *tongue* was not materially affected in many: in some, it was white; in others, it was covered by a soft, or creamlike, or yellowish, mucus or fur. The *fauces, pharynx*, and tonsils were generally red. There was always loss of *appetite*, and generally *nausea* or *vomiting* at the commencement; in some, bile was thrown up. *Thirst* was not complained of in the majority of cases. The *urine* was usually thick or turbid, somewhat red, and deposited a pink sediment as the attack subsided. *Cough* was always present from the first day, and was often very severe for two or three days; but it was often prolonged, sometimes after the subsidence of the attack, and assumed a convulsive form. There was often *dyspnœa*, with more or less wheezing and restlessness; but chiefly in the complicated cases, or in asthmatic persons. The *expectoration* was chiefly mucous, and as already described, unless in the bronchitic or pulmonic complications, or in those subject to chronic catarrh or bronchitis; and in these it was muco-puriform. No morbid *rhonchus* or *râle* was heard in most of the simple cases, although the cough and dyspnœa were severe. The *pulse* was more or less accelerated, generally soft, weak, and occasionally small, especially as the disease advanced; but it was often irregular—being at one time sharp, hard, or wiry, for a short period, and then becoming soft and weak. The sharpness or fullness of the pulse sometimes led to bloodletting, which was seldom of service, even when the disease was associated with inflammation, unless prescribed in great moderation, and at a very early stage. In London, however, bloodletting was rarely indicated by the symptoms; the phlegmasia often complicating the disease, being decidedly asthenic, and more frequently aggravated than ameliorated by vascular depletions. The *blood* was sometimes buffed in the complicated cases; the buff being deep and gelatinous, but seldom cupped or tenacious. Much mental and physical depression *existed;* and the character of the *febrile* or *constitutional affection* was decidedly *nervous* from the commencement, vascular action being more or less asthenic or adynamic throughout. But the febrile symptoms varied much, not only at different periods, but also at the same stage, according to the constitution, previous health, and age of the patient, and to the severity and complication of the disease.

29. *E. The sequelæ of influenza* were sometimes more dangerous than the primary malady; and the severity or danger of these had frequently no relation to the violence of the epidemic seizure; for the consequent affections were often most serious in persons who had experienced a comparatively mild attack of influenza, and as frequently slight in those who were severely attacked. — *a. Tubercular consumption* was observed chiefly in those who had an hereditary tendency to the disease, and in whom tubercles had evidently existed in a latent, undeveloped, or crude state — the influenza having promoted their evolution. — *b. Chronic bronchitis* also not infrequently occurred; either the bronchial complication having degenerated into a chronic and asthenic form, or this form having appeared during convalescence from the influenza, owing to the predisposition left by it. In either case, the disease was obstinate, and required a restorative treatment and regimen, with change of air. — *c. Asthmatic affections*, often presenting a nervous, convulsive, or spasmodic character, in conjunction with bronchial congestion or irritation, and sometimes with considerable bronchial discharge, were occasionally met with in persons advanced in life. In these, the cough, dyspnœa, and wheezing were more or less distressing; and complete or even partial relief was afforded with difficulty. — *d. Disease of the heart* was sometimes a sequela of influenza; but it might have existed previously, although it did not become so fully developed as to attract attention, until subsequently to the epidemic attack. Indeed, a more or less asthenic *endocarditis* or *pericarditis* may have occurred as a complication of influenza at some period of its course—this latter rendering the former still more obscure, until the more advanced consequences of the complication, and the subsidence of the primary malady, rendered the nature of the lesions more manifest. However induced, there can be no doubt that lesions of the heart of various kinds, and such as usually result from inflammatory irritation, were often met with in those who had experienced severe seizures of the epidemic. In some, the disease of the heart was associated with asthma or with more constant dyspnœa, and seemed aggravated by the debility consequent upon the influenza, especially in chronic cases, and where the heart-affection was not decidedly inflammatory. — *d. Hæmorrhage* from the respiratory organs was occasionally met with in those labouring under phthisis; but it may also have arisen from congestion of the lungs and interrupted circulation through the heart. — *e. Dropsies*, especially of the *thoracic cavities*, were sometimes observed as consequences, more or less remote, of severe attacks of influenza, particularly where the lungs had been implicated, or where disease of the heart existed previously, or where asthenic pericarditis had existed as a complication. But still dropsy was not so frequent a sequela of this as of some other epidemics. — *f. Obstinate dyspepsia*, and other *functional disorders* of the *digestive organs*, were very common sequelæ of this malady; and generally required change of

air, with strict attention to diet, for their permanent removal. — *g. Rheumatism* was a not infrequent consequence of the epidemic, and, as far as my experience enabled me to judge, was most benefited by a restorative and tonic treatment, with antacids, sometimes with colchicum, and change to a dry pure air.

30. III. PROGRESS AND DURATION. — The disease generally presented an acute stage, lasting from three to five days, and, in the slighter cases, terminating either then, or in two or three days. But it more frequently, especially in the severer seizures, continued, in a less acute form, for a period varying from five to fifteen days longer. — The course and duration of the complicated cases were very indefinite; and the recovery from these, as well as from all the most severe attacks, was attended with great debility, which often continued for a long time, even although none of the *sequelæ* or consequences just mentioned were manifested.

31. IV. DIAGNOSIS. — *Influenza* may readily be confounded with *acute bronchitis*, and with common or *sporadic catarrhal fever*, but may easily be distinguished from them, by attention to the following circumstances: — Influenza commences with very manifest disorder of the organic nervous system, as in all other idiopathic fevers, or epidemic maladies; and, although a predominant affection of the respiratory passages soon takes place, yet the digestive organs and circulating system are also more or less deranged. The dyspnœa attending influenza is much greater, relatively to the other indications of disorder in the lungs, particularly those furnished by the aid of the stethoscope, than in the complaints just mentioned. The pains complained of in the head, loins, limbs, and about the insertion and edges of the diaphragm; the severity of the cough in the night, and the general insomnia; the physical depression, and the weakness and irregularity of the pulse; the epidemic prevalence of the disease; and the different effects of medicine in it, and in those disorders; further serve to distinguish between them. — Influenza differs also from the *catarrhal fevers* of spring and autumn, in the great debility, in the spasmodic pains and disturbance of sensation generally, in the nausea and vomiting, in the disposition to sweating, and the occasional appearance of an exantheme, and in the peculiar expression of the face, which attend it; in its almost universal prevalence, and in the danger to the aged.

32. V. APPEARANCES IN FATAL CASES. — The changes observed after death were referrible — 1st, to pre-existent disease; and, 2d, to the effects of the epidemic and of its complications: to these latter only attention need be directed. The *trachea* and *bronchi* contained more or less of a frothy, muco-puriform, and frequently sanguinolent, matter, which was most abundant in the smaller bronchi. The *mucous membrane* lining these parts was generally of a dull red, or of a livid or dark hue, from congestion of the small vessels, and softened and thickened. These appearances were sometimes confined to one lung, but they more generally extended to both. The *substance of the lungs* was often darker than natural, and of a livid or violet colour. The air-cells, and frequently the tissue of the organ, seemed partially infiltrated by a muco-puriform, or muco-sanguinolent, fluid, which rendered it denser, and less crepitant on pressure, than usual; and its vital cohesion was much weakened. In aged, asthmatic persons, the lungs were generally very dark-coloured, much softened, infiltrated with fluid, partially emphysematous, and otherwise changed; a dirty or turbid serum being sometimes effused into the cavities of the thorax. The *pleura* was occasionally partly or very extensively adherent; but the adhesions were always the consequences of old disease. The *blood* in the heart and large vessels was generally dark and fluid.

33. In the younger and more robust subjects, where the indications of associated pneumonia were the most manifest, the lungs were also of a dark hue, congested, infiltrated with a dark or sanguinolent fluid, much denser than natural, or splenified, no longer crepitant, but not truly hepatised, as in true or sthenic inflammation; for the matter thus filling the areolar tissue of the organ was not a coagulated or fibrinous lymph, but an uncoagulable fluid, which could be more or less completely squeezed out of the part. The substance of the lungs was also torn with greater ease than usual, and the bronchial mucous membrane and bronchi presented the appearances already described (§ 32.). Both lungs were thus diseased, in many cases; and, even when one lung only was affected, the inflammation was more or less diffused, as in other instances of asthenic phlegmasia. In some, the most depending portions of the lungs were most infiltrated and congested — showing that the changes had partly taken place at the time of, or subsequent to, dissolution. — Appearances of asthenic inflammation were, in a few cases, observed in the *heart* and *pericardium*, with the effusion of a dirty serum into the latter; and, as Dr. CLENDINNING has remarked, in his excellent paper on the disease, these lesions were generally associated with those produced by pneumonia and pleuritis. Old disease of the heart was met with in many aged persons; and, in those who had been labouring under tubercular consumption, the bronchial mucous membrane, and tissue of the lungs between the tubercular formations, presented very similar changes to those described. The *digestive mucous surface*, particularly of the pharynx, œsophagus, and stomach, was congested, and sometimes presented patches or streaks of a dark red, or livid hue. — I never saw the exudation of lymph or coagulable albumen in the small bronchi, resembling the false membrane of croup, which Dr. GLUGE says he met with, nor is it mentioned by any other writer. My own dissections were few; but I have adduced also the results obtained by Drs. CLENDINNING, MACLEOD, GRAVES, and others.

34. VI. CAUSES. — The seasons, and the state of the weather both antecedently and at the time of the outbreak of influenza, have had no share in its production. Whether appearing in spring, summer, autumn, or winter; or occurring in mild and dry, or in cold and moist weather; or prevailing in cold, temperate, or warm countries; it has presented the same general features: and, even in seasons and climates most likely to have rendered it more than commonly mild, it has sometimes assumed a severe form; whilst it has presented a milder character in countries where it might have been expected to have been a more formidable disease. No dependence, therefore, can be placed upon climate, season, and weather,

in modifying its severity or complications, although they doubtless have had more or less influence in this respect on some occasions.

35. This epidemic has not arisen from the prevalence of easterly, northerly, or other winds; for, not only have winds from such quarters prevailed without influenza having occurred, but it has broken out in different places during the prevalence of winds from different quarters. That it has not proceeded from cold in any form or way, is proved by the circumstance of persons who took the greatest care of themselves, as respects clothing and exposure, having been attacked as well as those who were constantly subjected to the vicissitudes of season and weather. Yet, in some instances, as Dr. Graves has remarked, exposure to cold determined the immediate access of the disease, or increased its violence when present; and I would add, gave rise to several of its complications. No kind of occupation seemed to protect from its visitation; nor did the impregnation of the air with gaseous fluids, usually considered disinfectant, have this effect. It is probable, from the very rapid progress of the complaint over nearly the whole globe, that it depended, either, as Dr. Graves suggests, "upon telluric influence — upon some agency connected with variations in the physical conditions which operate on the external surface of our planet;" or upon a very general change in the usual conditions of the electricity circulating on the surface of the earth: but these, in the present state of our knowledge, are merely conjectures.

36. As to the influence of *infection*, in causing and propagating influenza, some diversity of opinion exists: but the question admits of a tolerably easy solution. That the disease neither originated in, nor was diffused by, *contagion*, direct or mediate, seems satisfactorily proved, by the nature of the disorder, and by the phenomena and circumstances connected with its appearance and spread. No facts have been adduced of a contagious property, according to the meaning I have attached to the term (see art. Infection, § 1—3.), having belonged to it; whilst numerous circumstances, showing that it was devoid of such property, have been observed by all who were practically acquainted with it. The almost simultaneous outbreak of the epidemic in distant countries; the rapidity with which it traversed immense spaces; the fact of its often pursuing, in its spread, a different course from that of human intercourse; the great numbers attacked at the same time, when it appeared in a town or district; and the frequent suddenness of the seizure; showed that it proceeded chiefly from a very generally diffused change in the atmosphere, that modified or infected the system in a determinate manner. That this malady depended principally upon atmospheric influence, these and other considerations fully prove; but that, in some instances, other agents or causes concurred with, or aided this, the principal cause, may be admitted. These other concurring or aiding causes seem to have been the ordinary exciting causes of catarrh, and infection proceeding directly from those labouring under the malady. It was often observed that communincation with those already attacked appeared to favour the developement of the complaint in the healthy; for, when an individual came with the disease from a distance, the inhabitants of the house in which he arrived were usually the first attacked. But it must be conceded, that this infection was a very subordinate cause to that, upon which the epidemic principally depended; and that it was merely a concurrent and contingent circumstance in the diffusion of the complaint.

37. The disease was not very materially influenced in its spread by *age*. It was, however, most prevalent in persons of from 16 to 60; and, upon the whole, the least prevalent and most mild in children, although severe and complicated seizures were not uncommon even in them. It was very frequent, most complicated, and severe in the aged — from 60 upwards. *Sex* and *temperament* did not appear to have influenced the liability to an attack. It did not appear that a former seizure caused exemption from it afterwards. The Author attended several persons in the epidemic of January, 1837, who had been attacked, as well as others who had not been attacked, by that of 1833; but he also saw some who had the influenza of 1833, and who escaped that of 1837. He is acquainted with very few instances of entire exemption from both these epidemics. He and his family escaped on both occasions. Generally, when one in a family was seized, the majority of its members were soon afterwards affected; but often two or three were attacked so nearly at the same time that it was difficult to assign the priority to any one. The epidemic continued about six or seven weeks in a place; but a few cases occurred just before, and others not until a short time after, its general prevalence. A circumstance of some importance, although very frequently overlooked, in respect not only of the two latest, but also of former epidemics of this kind, has been observed, and recorded by several writers; namely, the appearance of the complaint, also as an epidemic, among many of the lower animals, particularly horses and dogs, for some weeks or months before the outbreak of it in the human species.

38. VII. Nature.—It was evident, from an attentive consideration of its phenomena, that influenza partook largely of the characters of an epidemic fever. It was also manifest that the exciting cause of the complaint, whatever may have been the nature of that cause, existed in the air, and that, by this medium, it morbidly impressed the organic nervous influence, especially in the respiratory organs, where its first invasion took place in the process of respiration; these organs thus becoming and continuing prominently disordered. This primary and especial affection of the organic nervous influence was shown by all the premonitory and early symptoms. That this affection was not only peculiar or specific, but was further characterised by depression — that the organic nervous energy was remarkably weakened as well as otherwise changed — was evinced by the lassitude and debility which were present from the commencement of the seizure; by the affection of the digestive and circulating organs; by the spasmodic and nervous pains in the trunk and limbs; by the states of vascular action and of the blood; and by the general debility produced by the complaint. The circumstances of the pains not having been aggravated by pressure, of their wandering and diffused character, and of the spasmodic nature of the cough, were proofs that the disease was not essentially inflammatory, although

inflammation of a more or less asthenic form sometimes supervened. This position was further strengthened by the state of the circulating organs and fluids, and by the appearances observed in fatal cases. That fever, or rather increased temperature of the surface of the body, was not remarked in some cases, and in some even of the most dangerous complications of the disease, did not militate against the opinion of influenza being an epidemic fever *sui generis*, with early and prominent disorder of the respiratory passages and organs.

39. VIII. TREATMENT.—The *milder* and *simpler states* of influenza required little more than the early restoration of the cutaneous exhalation by diaphoretics, and the evacuation of disordered secretions by mild chologogue purgatives. In the majority of cases, five grains of blue pill and six of compound extract of colocynth, with one of ipecacuanha, given at bed-time, and a mild aperient the following morning if these did not act freely, were extremely useful; but, if there were nausea or retchings, seemingly proceeding from biliary disorder, a mild *emetic*, or the warm infusion of chamomile flowers, was premised with advantage. Subsequently diaphoretics, consisting of camphor mixture, solution of the acetate of ammonia, and the spirit of nitric æther, sometimes with a little ipecacuanha or antimonial wine, were given every third or fourth hour. In many instances nothing further was necessary; but, when the bowels required aid, a draught consisting chiefly of the compound infusions of gentian and senna, or a pill containing compound extract of colocynth, the extract of hyoscyamus and ipecacuanha, was taken at bed-time.

40. In the *more severe attacks*, and when much febrile excitement and heat or dryness of skin were present at the commencement, a full dose of calomel, with James's powder, and a grain of camphor, was given at bedtime, a purgative draught being taken in the morning. The diaphoretic prescribed above (§ 39.) was also taken every three hours, with a few drops of antimonial wine, until a free perspiration was produced. A warm bath was occasionally prescribed at bed-time, and generally was of great service. After a free perspiration had been procured, a few drops of the aromatic spirits of ammonia were substituted for the antimonial wine; and, as the disease declined, mild restoratives or tonics, and a light diet, were found most beneficial.

41. When the *cough* was very severe, and dry, or attended by much soreness at the chest, a larger dose of calomel and James's powder was prescribed, as much tartarized antimony as the stomach could bear was given in the diaphoretic mixture (§ 39.), and the warm bath, and warm demulcents, were resorted to. As soon, however, as the cough became more loose, and the defluxion from the respiratory surfaces either free or abundant, the calomel and the antimonials were relinquished, and the less depressing diaphoretics prescribed. The application of a mustard poultice, or of the warm turpentine fomentation, to the chest, or of a rubefacient plaster between the shoulders, was also serviceable. At an advanced stage of these cases, the following pills, either alone or in addition to warm diaphoretics, were found most beneficial, especially in aged or weak persons.

No. 268. ℞ Camphoræ rasæ, Massæ Pilul. Ipecacuanhæ Comp., āā ℈ j.; Extr. Hyoscyami (vel Extr. Papaveris) ʒ ss.; Mucilag. Acaciæ q. s. M. Fiant Pilulæ xviij., quarum capiat duas, quartâ, quintâ, vel sextâ quâque horâ.

No. 269. ℞ Massæ Pilulæ Scillæ Comp., Massæ Pilulæ Galbani Comp., āā ℈ j.; Pulv. Ipecacuanhæ gr. vj.; Extr. Conii (vel Extr. Papaveris) ℈ ij.; Olei Anisi q. s. M. Fiant Pilulæ xxiv., quarum capiat duas, quartis vel sextis horis.

42. When influenza was *complicated with bronchitis*, or with *pneumonia*, a modification of the above treatment was generally requisite. Much mischief, however, was produced—as I witnessed in several instances, in consultation—by having recourse to a too antiphlogistic means, and to large depletions, in these complications. Not infrequently, also, congestion only of the bronchial mucous surface, or of the lungs, and great accumulations, or inordinate secretions, of mucus in the smaller bronchi, were mistaken for bronchitis and pneumonia, and treated accordingly. Even where inflammatory action was more decidedly evinced, the fact of its association with an asthenic or adynamic condition of nervous power and of vascular action, was often overlooked, and a truly *nervous* or *asthenic pneumonia*, or *bronchitis*, was treated too generally in the same manner as the primary and uncomplicated states of these inflammations. The same remarks are nearly equally applicable to the occurrence of *pleuritis*, or of *pericarditis*, in the course of the malady. Even for these, bloodletting and the rest of the antiphlogistic treatment required the utmost caution. They were beneficial only when *very early* and moderately prescribed. I derived great advantage in these complications, from the application and repetition of embrocations or fomentations with spirits of turpentine, or with either of the *liniments* in the APPENDIX (F. 296. 311.), until considerable redness, or even vesication, was produced. Calomel or blue pill, with camphor and henbane, and sometimes with digitalis or ipecacuanha, or James's powder, was generally of service; and a diaphoretic mixture of camphor julep, the solution of the acetate of ammonia, spirits of nitric æther, or a small dose of antimonial or ipecacuanha wine, was very commonly prescribed. As the more inflammatory state subsided or disappeared, the aromatic spirit of ammonia was substituted for the antimonial preparation; and a restorative regimen and change of air recommended. (See arts. LUNGS—*Asthenic Inflammation of*; and PLEURA—*Asthenic Inflammation of*.)

43. If *bronchitis* degenerated into a chronic state, camphor, the decoction of senega, or preparations of squills or of ammoniacum, were employed; and the more permanent derivatives and counter-irritants resorted to. In such cases, the means described in the article BRONCHI (*Chronic Bronchitis*, § 93—103.), rarely failed of removing all disorder.

44. In the complications with *affection of the throat*, *larynx*, *or trachea*, the warm terebinthinate fomentations or embrocations, already noticed, applied around the throat and neck, never failed of imparting complete relief; the rest of the treatment already described being generally adopted. Blisters to the throat were injurious; but, when applied to the nape of the neck, or over the sternum, they were often of service. Early in these complications, as well as in the association with bronchitis, an emetic of ipecacuanha was frequently beneficial. The warm bath, the semi-

cupium, and pediluvia were also sometimes of service. When there was much tenderness of the epigastrium, and *gastric irritation*, a mustard poultice, or the warm terrebinthinate fomentation, or other rubefacients, applied to this region, and purgative enemata, generally afforded relief.

45. At an advanced stage of the complaint, when, in consequence of its severity or complications, the powers of life indicated much depression, by the state of the pulse, the perspirations, or the abundance of the sputa, or difficulty of expectoration, camphor, quinine, ammoniacum, senega, ammonia, and other expectorants and restoratives, in liberal doses, were indispensable.

46. During convalescence, change of air, a restorative regimen, and the use of flannel nearest the skin, were commonly necessary. In other respects, the same means as have been advised for the treatment of Debility (§ 35. *et seq.*), and for convalescence from Fever (§ 167. 612.) were then requisite.

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INSANITY.

— Syn. *Μανια, παραφροσυνη, παραφρονια, παραφρονησις*, Hippocrates, Galen. *Paraphrosyne, Paraphobia, Dæmonia, Dementia, Moria*, Auct. Lat. *Mania*, Boerhaave. *Amentia*, Vogel, Sagar. *Delirium Maniacum*, Hoffmann. *Phrenitis Apyreta*, Sauvages. *Vesania*, Linnæus, Cullen, Parr. *Ecphronia*, Good. *Mania Universalis*, Young. *Unsinnigheit, Tollheit, Schwermuth, Mondsucht*, Germ. *Folie, Démence, Phrénèsie, Manie*, Fr. *Mania, Insania*, Ital. *Madness, Mental derangement, Lunacy, Mental aberration, Unsoundness of Mind.*

Classif. — 2. *Class*, Nervous Diseases; 4. *Order*, Mental Disorders (*Cullen*). 4. *Class*, Diseases of the Nervous Function; 1. *Order*, Affecting the Intellect (*Good*). I. Class, III. Order (*Author*, in *Preface*).

1. Defin. *A deviation from, or perversion of, the natural and healthy state of the mind, as manifested either by the moral emotions and conduct, or by a partial or general disorder of the intellectual powers and understanding.*

2. *Insanity* — *Insanitas* — was formerly employed to signify a deranged state of the health, either of body or mind. But it became more especially applied to mental disorders — *Insania* — and lately has been entirely limited to them. It may be considered to comprise all morbid manifestations of mind, whether partial or general; or with whatever series of symptoms they may be accompanied, whether with those of excitement, or of depression, of any of the functions, either of mind or of body. Insanity, however, and especially certain moral states of it, is often nothing more than an exhibition of the natural character, and moral disposition of the individual, over which reason has ceased to exercise its control, or which has become remarkably prominent, or even per-

verted by excessive indulgence and unexercised restraint. The inordinate gratification of passions or moral emotions, not only gradually weakens the influence of reason and of self-control, but also imparts to these emotions a perverted and truly morbid character, and allows them to assume forms at variance with the established opinions and habits of the world, and with the laws of society.

3. It is extremely difficult, if not impossible, accurately to *define* insanity, or to draw a line of demarcation between it and what has usually been denominated singularity of opinion, or eccentricity of conduct. The latter states, viewed either in their moral or in their intellectual relations, insensibly pass into various acknowledged varieties of the former, and are often merely states of transition from the healthy mental manifestations, to a condition indisputably morbid. Since the time of Locke, it has generally been considered, that the insane have not lost the power of reasoning; but, having entertained, as real, some illusion or erroneous impression, they err, by reasoning from wrong premises. This idea appears to have been adopted by Cullen, who remarks, that "there is generally some false perception of external objects, and that such false perception necessarily occasions a delirium or *erroneous judgment*, which is to be considered as *the disease*." But this, too limited a definition, was more extended where he states insanity to be, "in a person awake, a false or mistaken judgment of those relations of things which, as occurring most frequently in life, are those about which the generality of men form the same judgment, and particularly where the judgment is very different from what the person himself had before usually formed." But, as Dr. Prichard has remarked, these definitions apply only to one class of cases, and especially to *melancholia*, *monomania*, or *partial insanity* — to these forms, in which certain illusions exist, and the judgment is *comparatively* clear on all other topics unconnected with the illusions entertained. But, although the judgment seems comparatively clear on other topics than those connected with the morbid illusion, yet it must not be considered with Locke, that the insane make right deductions from their illusions. As Dr. Conolly has more justly observed, "the judgment is but the result of comparison; comparison is alternate attention; attention is a faculty dependent on the brain," — and one, I would add, which is most early and most generally disordered in mental diseases. I therefore quite agree with this writer, that, in all cases, even of partial insanity, the judgment is more or less weakened and perverted.

4. Besides the above limited forms of insanity, there are others of a more general and manifest kind—namely, 1st, *Maniacal* or *raving insanity*, in which the mental manifestations are more generally and more severely affected, the derangement being characterised by great excitement, wildness, violence, and absurdity; 2dly, *Imbecility*, and *Incoherent*, or *fatuous insanity*, in which the mind is altogether incapable of any effort; the intellects being remarkably impaired, and the ideas being rapid, unconnected, or incoherent. To the preceding forms, in which the *intellectual manifestations* are primarily and chiefly disordered, some recent writers have added another, viz. *Moral insanity;* in which the intellectual powers are but little, or not very manifestly, impaired; the disorder appearing chiefly in the emotions, habits, and conduct. In this form of mental disease, the moral and active powers are perverted or depraved; self-government is either greatly impaired, or altogether lost, and the individual is incapable of conducting himself with propriety, in many of the relations of business and society. As Dr. Prichard observes, "his wishes and inclinations, his attachments, his likings and dislikings, have all undergone a morbid change; and this change appears to be the originating cause, or to lie at the foundation of any disturbance which the understanding itself may seem to have sustained, and even, in some instances, to form, throughout, the sole manifestation of the disease." It must not, however, be supposed, that the understanding, in such cases, is altogether unaffected. It may not present any very obvious delusion or aberration from the usual condition; but it is certainly more or less weakened; and the patient is incapable, from habit or from impaired nervous power, of exerting those manifestations of mind upon which judgment and self-control depend, with the vigour and precision of health. Besides, the indulgence, or the inordinate excitement or sway, of the emotions and passions, leading to moral insanity, necessarily tends to weaken or to obscure the understanding, and ultimately to overturn it altogether.

5. Whilst we observe insanity arising almost insensibly from the misdirection of certain manifestations of mind, from the excitement or the over-indulgence of others of these manifestations, and from the utter neglect of some of them, aided by an impaired power of attention and comparison; we not infrequently also perceive it to proceed from those diseases and injuries which affect, more or less remarkably, the functions, circulation, and organisation of the body, and particularly of the brain and nervous systems: — fevers, in which vascular excitement becomes inordinate, or in which organic nervous or cerebral power is much depressed, frequently, derange the mental powers in their course; and the derangement, owing to organic lesion produced in their progress, may become more or less permanent. The cerebral functions are generally disordered in the more severe cases of inflammation of the brain or of its membranes, and the disorder often assumes a most violent form; but it either entirely disappears, or partially subsides, with the removal of the organic condition upon which it depended, unless when the brain has sustained some injury that unfits it for the performance of its offices. In all these instances, however, the mental alienation is merely a consequence, or symptom, of the bodily disease, which has assumed its specific form and character before the mental affection appeared. It must not, from this, be supposed, that mental disorder is not, in its more chronic and primary forms, quite unattended by signs or symptoms of physical disease, referrible either to the system generally, or to the brain more particularly, or even to both. Cases of insanity are comparatively few, in which no indication of such disease is to be traced; the chief differences being, the obvious nature, the extent, the duration, and the kind of bodily affection which has preceded, and which accompanies the mental disorder.

6. When, however, insanity has proceeded

from bodily disease, or from external injury, the latter either may have been entirely removed, or its effects only may remain; the former enduring either for a time, or more permanently, owing to the consequences of the physical affection upon the nervous power, or upon the intimate organisation of the brain, and yet the organic functions may manifest little or no disorder.

7. *Insanity* may, therefore, be viewed as a generic term, comprehending every grade of *perversion* of the *moral*, or of the *intellectual*, or of the *instinctive, manifestations of mind*, or, of any two, or of all these classes of manifestations, from the healthy states,— to such perversion, a more or less manifest but variable alteration of the *sensations, perceptions, judgment*, and *voluntary movements*, being usually added; or, in other terms, the essential phenomena of insanity are — a more or less manifest or extensive change of the functions of the brain from their accustomed healthy condition — of the sensibility, the perceptions, the intellectual and moral powers, the judgment, and the movements, without any profound, obvious, or durable affection of the organic functions.

8. Yet these latter functions are not always, or even generally, devoid of disorder. They have been too commonly either overlooked altogether, or imperfectly attended to, or insufficiently investigated; the predominance of disorder of the cerebro-spinal nervous system, and preconceived notions of the relations of mind to organisation, and of the nature of insanity, entirely occupying the attention of the observer.

9. The history of medical literature, in respect of insanity, shows, that the study of the malady, and a knowledge of its pathology and treatment, have been long influenced and retarded by prejudice and superstition, by attributing all mental disorders to supernatural agency, or by considering them in the spirit of system. It has been justly remarked by M. Foville, that works on mental alienation present the two principal characters distinguishing medical writings; — the one class being dictated by observation, and containing information, the accuracy and the utility of which can never be impaired; the other imbued with the spirit of system, and manifesting all the follies that may be conceived. The chief advantage that can be derived from the latter class of writings is, to induce us to examine, for the guidance of our own opinions, the phenomena of mental disorder with the strictest attention; to limit ourselves chiefly to the description of what we observe, and to submit with the utmost caution to the ambition of explaining.

10. In *treating of insanity*, I shall closely adhere to the results of observation, and describe— 1. The phenomena, the essential and accessory symptoms; 2. The diverse forms and classification; 3. The terminations; 4. The organic lesions observed in fatal cases; 5. The predisposing and exciting causes; 6. The physiological pathology; and, 7. The treatment of insanity. — *Connate Insanity* or *Idiotcy, Puerile Imbecility, Puerperal Insanity*, and, lastly, *Suicidal Insanity*, will be afterwards considered in distinct chapters.

11. I. Symptoms of Insanity. — The study of the phenomena of insanity, according to the several functions chiefly affected by it, is of great importance, not only in arranging the various forms of the malady, but also in classifying the patients, and in determining with precision and success the method of treatment. In the general view, therefore, which I am about to take of the essential and related symptoms of insanity, I shall consider,—1. Those furnished by the *sensibility*, or connected with the *impressions*, the *sensations*, and the *perceptions*; 2. The phenomena exhibited by the *instinctive*, the *intellectual*, and the *moral manifestations*; 3. The symptoms connected with the *locomotive apparatus*; and, 4. The phenomena furnished by the *organic functions*. In the *general description* here about to be entered upon, I shall confine myself to those states of insanity, the existence of which admits not of dispute, and leave, until I come to the consideration of the special forms of alienation, the discussion of those *states* which are the least manifest, or which have not been generally admitted as constituting forms of insanity, either from their *slight or partial nature*, or from the circumstance of the *moral manifestations* being chiefly affected, the intellectual powers being much less prominently disordered (§ 4.).

12. i. The Symptoms furnished by the Sensibility are extremely numerous and diversified. They consist chiefly of false perceptions, arising from one or other of the following sources: — 1st, from disorder of the organ receiving the impressions; 2dly, from an affection of the nerves conveying the impressions, the organ itself being sound, 3dly, from profound disease of the parts destined to perceive them, the morbid impression taking place without any external excitement or cause; and, 4thly, from disorder of the general sensibility. But, as will be shown in the sequel, false perceptions, or illusions, more frequently proceed from two or more of these sources, than from any one singly.

13. *A. False perceptions arising from a disorder of the organs receiving the impressions*, are evinced by the state of these organs, particularly in regard of the presence of actual disease of them, and by the effects following the abstraction of their respective stimuli. The existence of disease will generally be ascertained upon a close examination of the sense, whose functions seem especially disturbed; and it is not infrequently observed, both where disease of the sense exists, and where it cannot be detected, that the shutting out of the appropriate stimulus — as by closing the eyes, or the ears, or the nostrils — arrests the morbid perception haunting the patient, by preventing the production of sensation. Esquirol, Reil, and Foville suppose that, where the morbid perception thus ceases upon shutting a particular sense, the cause of it exists in that sense: but this is not the case; the error arising from the circumstance of their confounding, with most of their countrymen, sensation with perception. A sensation will be morbid where the organ is disordered, but it will not necessarily be followed by a morbid perception, unless either the nerves conveying the sensation, or the brain itself taking cognisance of the sensation, be disordered, as respects either the state of its organisation or circulation, or the discharge of its functions. In cases, therefore, where closing the organ of sense causes a morbid perception to cease, such perception is not to be referred altogether to the state of the senses, but partly also to the organ of intelligence — to the understanding, which is obviously incapable of correcting or judging aright the re-

port conveyed by the sense especially affected. Indeed, the intellect may be so weakened as to be more than usually susceptible of derangement, either when inordinately excited by the senses, or when manifest disease of them exists. In cases of this description, the mind is incapable of paying due attention to the various circumstances connected with the morbid sensation or impression, of comparing them, and of judging them as in health; and this obtains especially when the sensation is novel, or even indistinct, as well as when it is inordinate, or too strong, relatively to the nervous susceptibility — to the cerebral power of the patient; and when it either forcibly or unusually impresses a mind already more or less deranged. Although, therefore, the disorders referrible to the senses, as ophthalmia, amaurosis, ottitis, ozena, caries of the teeth, &c., are sometimes concerned in the production of false perceptions in the insane; yet equally much, if not more, is to be imputed to the brain itself, and to its functions, which are mainly concerned in producing the morbid perception, and are obviously incapable of ascertaining the illusion: the morbid *sensation* appertains to the sense, and the nerves connected with it, but the false *perception* is chiefly the act of the brain.

14. *B. False perceptions without disease of the organs of sense.*— False perceptions of this kind have been called *illusions* by some, and *hallucinations* by others. M. Esquirol proposes to confine the latter term to them; and he defines them to be sensations perceived at a time, when there are no appropriate external objects present to excite them in the organs of sense. This class of false perceptions is much more common than the foregoing, and occurs in every possible form. Both the blind and the deaf may be subjects of illusions of the senses of sight and hearing respectively. The majority of those who are haunted by hallucinations of this kind suffer more in solitude, in darkness, and during silence, when the senses are in a state of repose, than in other circumstances. The distractions, incitements, and sensations experienced in society sometimes allay or obscure these illusions; but, however powerful, much more frequently they have no such effect, the mind continuing, nevertheless, to be engaged only with its morbid perceptions. The patient, when he speaks, is interrupted by them; he answers to voices which call upon or address him, or contemplates objects which have no existence.

15. Sometimes the illusions relate to one sense, and occasionally to more than one, or even to all the senses. Those of hearing are the most common; next those of sight, smell, and taste; the illusions connected with the two last being often associated. Those belonging to the sense of touch are the most rare.

16. Darwin supposes that hallucinations proceed from inflammation of the origin of the nerves of sensation; and M. Esquirol says, that "the false sensations of those subject to hallucinations are images and ideas reproduced by the memory, associated by the imagination, and personified by habit. A person in such a state converts the product of the understanding into a corporeal form; he dreams while he is awake; but, in those who dream, the ideas which were entertained while awake continue during sleep, whilst he who is in a delirium perfects his dream when waking." M. Foville justly remarks upon this opinion of M. Esquirol,— 1st, That hallucinations often do not furnish precise or determinate sensations like those which memory recalls — confused objects, or vague sounds, &c. are frequently only seen or heard: 2d, With many, however diversified or rapid the succession of ideas engaging the imagination, the illusion continues limited to one sensation, and is always reproduced in the same form; the patient always sees the same object, hears the same voice, or inhales the same odour: 3d, The delirium of the insane depends, in many cases, upon false sensation. All the wanderings of the mind are only the consequences of this. When patients recover, they say, "I have seen and I have heard as distinctly as I now see and hear you," while at the same time they are able to give an account of the errors of their imagination: 4th, In some insane persons, the hallucinations have preceded the delirium, and have been recognised by the patients themselves at the commencement as false perceptions; but at a later period, when combined with intellectual derangement, they have been regarded by them as real: lastly, One sometimes finds, in cases of hallucination, changes of the nerve destined to convey impressions; and although it may not be readily conceived how an alteration of the optic nerve, for instance, determines false perceptions relative to vision, it cannot be more easily explained wherefore disease of a nerve of motion in neuralgia causes involuntary movements of the muscles; we may as well believe that alteration of the nerve is the true and sole cause of the hallucination, although in the healthy state the will may be the only cause of voluntary motion, as that external excitants, the impressions on the organs of sense, are, in health, and during waking hours, the only natural cause of all sensation and of all perception. There is, besides, this analogy between the two cases,—that neuralgia of a nerve of motion does not ordinarily bestow the influence of the will on that nerve, and by consequence upon the muscles, and that the alteration of a nerve of sensation giving rise to hallucinations does not destroy the perception of sensorial impressions, although it often disturbs and impedes them.

17. It is much better supported by close observation and *post mortem* research, and hence much more probable, that illusions or hallucinations arise from lesions of the nervous parts intermediate to the organs of sense and the centre of perception, or from alterations of the parts of the brain into which the nerves of sensation enter, or in which they terminate. Illusions similar to those which occur in the insane, sometimes take place in persons whose intellects are sound; but a healthy understanding appreciates the false perception correctly, whereas the disordered mind confounds them with realities. It may hence be inferred that they are the effects of lesions which do not necessarily or constantly implicate the understanding, but which more frequently, owing to intensity or extent, affect the intellectual faculties, and especially the powers of attention and reflection.

18. Whatever may be the point of organic departure of hallucinations, they are lively or sad, capable of inspiring sentiments of benevolence, or of arming the hand of the maniac with an instrument of homicide. The supporters of the doctrine

of **Gall** suppose that the characters they assume entirely depend upon the portion of the brain affected — upon the point in the organ whence they proceed. The effects, however, of hallucinations upon the minds of the insane are undoubtedly as real and as positive as the impressions produced by external excitements.

19. *C. Delusions or false perceptions connected with the general sensibility.*— These disorders, from the most simple and circumscribed to the most general and complicated, are constantly met with in mental diseases. Persons who believe that they have in the belly, or in the chest, or in the head, an animal which preys on them, are as much the subjects of disordered sensations as those who say that they are without a stomach, or a heart, or head, and who otherwise are tormented by the most strange feelings. Those who believe that they have the devil in their bodies are victims of morbid sensations, which their disordered mental faculties refer to this cause. In many cases the delusion, false perception, illusion, or whatever else this kind of symptom may be called, evidently results from a state of suffering — from disease in the parts to which the delusion is referred. They are, in fact, symptoms dependent upon local lesion, traces of which are generally discovered on examination after death, the morbid sensation being misinterpreted by the erring judgment of the patient. M. **Foville** justly remarks that, without the state of pain, or morbid sensation, occasioning the delusion, the delirium of the insane might take another direction, and might be more easily appeased; and that one of the most efficacious means of attaining this object is to remove, when this can be done, the pains or sensations which give rise to the delusion.

20. In some instances, the delusion is unattended by any appreciable disorder of the part to which it is referred. It may depend, judging from analogy, upon an alteration in the nerves conveying impressions made in parts which they supply, or to which they are distributed; or even in those which are connected, or sympathise, with a disordered structure. The well-known example of pain referred to parts removed by amputation may be adduced in support of this view. — From what has now been stated, the delusions depending upon the general sensibility may be divided into — 1st, Those which seem to proceed from some alteration or lesion of the parts to which they are referred; and, 2dly, Those which seem to depend rather upon the state of the nerves transmitting the sensations, or upon the nervous centres themselves, than upon any appreciable lesion of the parts which are the seat of the delusion.

21. *a. Delusions with lesion of the parts to which they are referred.*— Many instances of this kind of delusion have been mentioned by authors. M. **Esquirol** states, that in one of his patients there existed considerable tension of the abdominal muscles, with tenderness of the abdomen. The devil, the patient said, had placed a cord from the pubis to the sternum, and a demon in her body, which burned, pinched, and bit her heart, and tore her entrails. Amongst other alterations found after death, the usual changes consequent upon chronic inflammation of the peritoneum and pericardium were found. Here the relation between the symptoms of the physical change and the mental delusion is sufficiently manifest. The same writer, amongst other instances, mentions the case of a female who believed that she had no longer any body, and that it had been carried away by the devil, for she felt nothing. M. **Esquirol** inserted a pin under the skin of her arm, without causing any evidence of pain. The loss of sensibility was evidently in this case connected with the production of this particular delusion. Another female fancied that the devil lay with her: she had constant pain and tenderness in the region of the uterus; and these were doubtless connected with the origin of the insane idea. There is here a very evident similarity of these delusions to the false perceptions attending disease of an organ of sense. All these morbid sensations are correctly judged, and their real natures appreciated, by the sane mind; but the disordered intellect is unable thus to recognise them, variously transforms them, and contemplates the forms into which it changes them, as real existences; superstition, previous habits and occupations, predominant feelings and religion, severally imparting to them the shapes which they assume, or the colour and character which they present. Similar to the above instances is one mentioned by M. **Foville**. A man, who received a severe wound at the battle of Austerlitz, continued insane ever since. His delusion is founded on that which he no longer recognises; he has lost the sensibility of the surface; and he believes that he no longer exists. He says, that that which you see there is not he; that it is a machine which has been made to resemble him, and which is very badly made. This man often falls into a state of complete immobility and insensibility, which last several days. Vesicatories and sinapisms never produce the least signs of pain. He often refuses to eat, saying that the machine which has replaced him has no belly, and that it has no need of food. His external surface and extremities evince no sensibility. The strange delusion which this patient labours under is manifestly founded on the loss of sensibility in these parts, and on the absence or marked modifications of organic sensibility.

22. *b. Delusions connected with the general sensibility that are independent of alteration of the parts to which they are referred,* seem to be more rare than those in which some lesion or other exists. It is the reverse in regard of false perceptions connected with the special sensibility — with the organs of sense. Not infrequently, however, these different kinds of false perception — of delusion and hallucination — are associated in the same case. The delusions of most insane persons have more or less reference to, or are influenced by, their education, their habits, their prejudices, their studies, their fears, &c.; and are often attributed by them to sorcery, to demons, to various physical causes, &c. A weak superstitious person believed that he had the devil in his belly. For a long time he could not make out how he got there; but he at last fixed upon the idea, that his father sold him to the devil in the presence of a notary for a sum of money. Just before he was taken ill, this young man accompanied his father to a notary, where they met a stranger who paid the father some money. This was in hot weather, and, on leaving the notary's office, the young man took some glasses of bad cider, and

complained soon after of pains in the abdomen, which have since continued to afflict him; and it was upon this circumstance he based his delusion.

23. Too great importance cannot be attached, in the practice of mental disorders, to the various lesions of sensibility, or too much attention paid to false perceptions and delusions of all kinds, both as respects their connection with physical lesion, and as regards their consequences, or influence upon the subsequent course of the malady. It is very manifest that the patients, who are the most dangerous to themselves and to those who are about them, are those who are subject to some one of these false perceptions or delusions. One insane patient hears a voice, which says to him, kill him or them. He resists the impression for some time; but at last believes it to be a supreme command, and obeys it. Another has recourse to suicide, either to avoid the punishment or distress of these hallucinations, or in obedience to orders, which he believes he has received from the Almighty, and which he is bound to execute. There is much more reason to distrust a maniac, who is subject to delusions or hallucinations, and to exercise strict control over him, than one who is not so afflicted.

24. All the foregoing kinds of false perceptions require also very close observation, especially with reference to their physical relations, — to the states of the organs to which they are referred, — in order that appropriate methods of treatment should be employed. It is obvious that, if the delusion be founded upon, or in any way connected with, functional or structural lesion, means should be used to remove such lesions; for, as already shown (§ 19.), organic disorder either occasions, or perpetuates, or aggravates, the morbid sensation, which the deranged mind perceives or construes falsely.

25. *c. Various other lesions of sensibility are often observed.* — Insane persons often tear themselves with their teeth or nails, without manifesting the least pain. Some eat straw, grass, &c.; some even their own excrements; and others gnaw their fingers or extremities. Patients have, in a few instances, picked or scratched parts of their own bodies, until large cavities or holes have been thereby made (ESQUIROL, FOVILLE, &c.). Some possess a remarkable power of bearing, without suffering, extremes of heat and cold. Some authors allege this to be general among the insane, but this is an error: the greater number do not manifest any sensible difference in this respect from the healthy. Others deny this altogether; but it is certain that many insane persons bear, without appearing to suffer, and without feeling the least inconvenience, the most excessive cold. CURRIE, RUSH, ESQUIROL, FOVILLE, and others, cite numerous instances proving this circumstance, — not the least coryza, or catarrh, or complaint whatever, having followed the exposure to cold. Some patients can fix their eyes upon the most intense light, and even upon the sun, without being dazzled thereby. M. FOVILLE adduces several instances, where vision was by no means weakened by having the eyes fixed for some time upon this luminary, in the month of July; the patients being able to read, immediately afterwards, a book printed in very small characters. Most insane persons readily addict themselves to the use of tobacco. They smoke, chew, or snuff it with avidity — females as well as males — when they can obtain it.

26. ii. SYMPTOMS APPERTAINING TO THE MORAL, INTELLECTUAL, AND INSTINCTIVE MANIFESTATIONS OF MIND. — The disorders of these manifestations are as numerous as the possible combinations of our ideas, and as diversified as our passions, propensities, prejudices, affections, and education. They present themselves under two forms: in some cases they have reference only to a single train of ideas; in others, they comprise a greater number. It is especially to this class of symptoms that the French pathologists have applied the term *delirium* — the disorder of the mental faculties forming with them the delirium of the insane; and upon the limits or extent of this disorder has been founded the division of intellectual derangement, or of the delirium, into partial or exclusive, and vague or general. The mental disorder, moreover, may be evinced chiefly in the moral, or in the intellectual, or in the instinctive, manifestations, or it may extend itself much more generally. It is according to the nature and extent of the disorder, that arrangements of mental diseases have commonly been attempted. In the one class, whatever may be its limits or extent, there is only a perversion, or an aberration, of the faculties; in the other, the faculties are altogether lost or obliterated; and this privation is either congenital or primary, or accidental or acquired. "Who is there," says M. ESQUIROL, "who can flatter himself to have observed, and to be able to describe, all the symptoms of mania, even in a single individual?" It is particularly to the very extensive class of symptoms now under consideration, that this reflection is applicable. How are we, observes M. FOVILLE, to comprehend the fugitive and multiplied shades of general delirium? How are we to trace the infinite subtilties of partial delirium, or monomania? In *general delirium*, or *maniacal* and *incoherent insanity*, ideas the most extravagant, images the most fantastical, associations the most discordant, emotions the most opposed, succeed each other with electric rapidity. The maniac confounds in his mind heaven, earth, and hell, his domestic affairs, his affections, politics, and morals. He speaks in verse, sings, laughs, weeps; utters his sentences with marked or peculiar emphasis; he speaks by turns in all the languages he may know; retraces his steps, lifts or extends his hands or tosses them right and left; dances, jumps, and utters menacing cries; rushes on his companions, tears all that comes in his way; strips himself naked, rolls on the ground, &c. &c. In these cases the functions of mind are not destroyed, but they are morbidly excited — they are actively deranged — and are no more like their healthy condition, than convulsions resemble the quiet walk of a man in health. On the other hand, in *partial insanity*, or monomania, the mind is concentrated upon one object or train of ideas, whatever it may be. The patient displays infinite resources to justify his error, and applies the most imperturbable attention in pursuit of it.

27. Disorders of the passions, and more especially of the intellectual faculties, particularly characterise general or maniacal insanity; disorder of the affections chiefly mark partial insanity, the intellectual faculties being but little affected. It is in the former that the greatest

agitation is observed, many patients vociferating day and night, until their voices become, in a short time, so altered, that, in spite of their efforts, they cannot be heard at the distance of a few paces — a species of *aphonia*, peculiar to the maniac. Although this aphonia is partly caused by the efforts to cry, still it seems to be in some degree owing to the state of nervous influence, for some patients evince it from the very accession of their malady. Some maniacs present the peculiarity of repeating all their actions, questions, or expressions, or even their discourses, a certain number of times. The simple repetition of these acts or expressions has been referred to a want of harmony in the action of both hemispheres of the brain; but the repetition is sometimes oftener than once.

28. Amongst maniacs are found instances of erotic excitement, of an exaltation of parental or filial affection, or of the ties of friendship. Some are ferocious, others quarrelsome, others have a propensity to murder, or to steal; and many are remarkably cunning and deceitful. All large establishments contain maniacs of pride; princes, sovereigns, great dignitaries, and even gods themselves, are not rare. Vanity is observed in all its extravagances, furnishing the best lesson to the vain fools who strut their hour on the stage of modern society. Here are found patients a prey to the most distressing anxiety, to the utmost mental agony; seeing in the present and in the future nothing but despair, imploring death, and desirous of inflicting it upon themselves, in order to escape from their miseries. Some dream of nothing but change, of distant journeys or voyages; others have lost their memory of persons or of things; and several, particularly during the exacerbations of the disease, can no longer speak their own language, but give utterance instead to confused and fantastical sounds, delivered in the tone of a continued discourse. Painters, musicians, and artists of all kinds, appear among those whose education has not been directed to the arts; and even poets, or, at least, rhymers, spring up amongst those who even have not learnt to read. Visionaries of all kinds abound; some apply themselves incessantly to the solution of the greatest problems of nature, or of the most difficult questions in metaphysics, religion, politics, political economy, &c., although uneducated; and prophets, saints, and martyrs are not uncommon.

29. Ought it to be inferred from all these varieties, as regards the intellectual disturbance, that each of them is connected with an isolated and distinct lesion of a particular part in the brain? Ought we, in the present state of our knowledge, to admit that the organ of the understanding is composed of an assemblage of particular and distinct organs for each propensity, and for each endowment? Ought we, in fact, to adopt, to its full extent, the psychological system, according to which these questions are answered in the affirmative? It would be out of place here to discuss the real value of a psychological system; but it becomes necessary to notice the assertions of those authors who maintain that, in partial insanity, particular forms of the skull correspond with the varieties of the mental affection; that they are able even to trace the propensities, the talents, dispositions, and dominant ideas of their patients. However, impartial observation of the insane, as M. FOVILLE very justly remarks, does not confirm the accuracy of these assertions. This writer, whose experience is most extensive, and powers of observation very great, states, that it is certain, that the same partial delirium, in many patients, corresponds to opposite forms of the same part of the skull. In some religiously insane, he has found the superior and middle part of the cranium remarkably developed, whilst, in others, the same portion was much below the ordinary magnitude. The insane who suppose themselves kings, emperors, princes, &c., are far from presenting, generally, a marked development of the regions of the organs of ambition, domination, vanity, &c., as assigned to them in the system of GALL, but are often inferior in this respect to those who pass the whole day in sweeping or cleaning the courts, &c., or who are most interested in the most menial occupations. If there exist distinct organs for every faculty or propensity, it is not necessary, I admit, that their development should be at all extraordinary, in order that irritation or inflammation should excite their activity, or occasion prominent or peculiar phenomena as respects them. But it may be stated, at once, that we often find, in cases of partial insanity, lesions as extensive as in those where the mental disorder was general; and that we occasionally observe instances of partial delirium, that cannot be the result of the excessive, or of the irregular, exercise of any fundamental faculty, or of vascular disorder limited to any particular part of the brain, to which such partial affection may be referred, even by those who espouse the doctrines in question. To the lesion of what fundamental faculty does the insane notion of a man correspond, who believes himself changed into a woman, *et vice versâ?* or of a person who believes himself transformed into a dog, assumes his habits, barks like him, walks on all fours, bites, &c.?

30. It may be truly said of partial insanity, that whatever, in the course of a man's life, may be to him an object of a particular regard or propensity, of a distinct taste, of a ruling passion — all the bizarre or fantastical ideas which his mind may entertain, may, in a state of disease, become the subjects of his delirium or hallucination; that many delusions — many forms of partial insanity — cannot really be referred to lesion of a particular faculty, or of that portion of the brain which has been considered the origin of such faculty; and that, in short, where it appears reasonable to refer them to an alteration of this kind, attentive examination of the conformation of the skull is far, in the majority of cases, from corresponding to the assertions of the authors of the psychological system in question. It must not, however, be inferred from what has just now been advanced, that attentive observation of the forms of the skull of the insane is of no use; on the contrary, a regularly developed cranium, of a reasonable size, ought, *cæteris paribus*, to assist an opinion, as to the possible issue of the disease, very different from that inferred from a small, confined, and deformed skull. What has been stated applies only to the assumed seats of fundamental faculties, exclusively or principally affected in certain patients. In short, the disorders of the intelligence in the insane are partial or general, as regards the intellectual faculties, properly so called, and likewise in respect of the passions and affections.

31. In a very great majority of cases the insane are unconscious of the state of their minds, and are offended at being considered mad. They even accuse those of insanity, who do not admit the integrity of their intellects. Some, on the contrary, are conscious of being deranged, but are unable, nevertheless, to correct the aberrations of their reason. These rare instances show what benefit may be expected to result from attempts to convince an insane person that he is deranged.

32. iii. THE SYMPTOMS FURNISHED BY THE LOCOMOTIVE ORGANS. — The disorders of voluntary motion in the insane may be divided into — 1st, Those which are temporary and local; and, 2dly, Those which are persistent and general. — *a.* In many, the movements become remarkably vigorous and energetic; an irresistible inclination to run, jump, gesticulate, &c. manifesting itself, produced by the general irritation, which occasions the mental affection. These, however, cannot be regarded as important or specific alterations; but sometimes, during the paroxysms of the alienation, the muscles of the face, or of an arm, or of a leg, are agitated by *irregular movements, like convulsions,* which are strictly local, are very distinct from the general convulsions of epilepsy or hysteria, and resemble the involuntary movements attending neuralgia. These irregular and convulsive actions of the muscles of a single part or limb are met with chiefly in the intermittent or paroxysmal forms of insanity, or in exacerbations of the disease; and are evidently dependent upon the morbid condition of the brain, from which the paroxysms or exacerbations of mania result. They are only occasionally observed, and were first described by M. FOVILLE.

33. *b.* An incomplete and *peculiar form of Palsy* is much more common in the insane than the foregoing local convulsive action, and is even much more serious. It is not mentioned by the older writers, and it is but slightly noticed by PINEL. M. ESQUIROL has studied it with much care, and especially with reference to the ulterior progress of the mental disease. More recently, MM. DELAYE, BAYLE, and CALMEIL have investigated it still further. This affection, usually designated the paralysis of the insane, and general or incomplete palsy, consists of a general and gradual loss of power in the voluntary muscles. It commences with an embarrassment of the motions of the tongue, or with indistinct articulation. Patients hesitate for a time at some syllables, which they overcome only by an effort. They are unable to pronounce some letters, — the R, for instance, — or they express them with difficulty. Afterwards a similar embarrassment is observed in the movements of the arms, legs, &c.; and lastly, in all the muscular system. The disorder possibly commences as early in the muscles of the limbs as in those employed in articulation; but as these latter require a greater precision of action for the due performance of their functions than the former, they more readily betray the incipient disorder, and this disorder is thus more early brought to the notice of the physician.

34. It requires, however, some experience to enable the physician to ascertain the commencement or earlier grades of this affection. When it has made some progress, the diagnosis is easy. The embarrassment of pronunciation is then very sensible. The patient cannot speak without throwing all the muscles of the face into action. The walk is vacillating; the motions of the arms and hands are unsteady and awkward,—and these last constantly tremble, and are incapable of retaining a determinate position. It is not, however, as yet, the force, so much as the precision, of the movements that is impaired. A patient may squeeze any object with much power, but he cannot execute any delicate work, or even button his own vestments. In attempting to run, his course is irregular, or attended by deviations to the right and left, like to an intoxicated person; he exhibits the appearance of suppleness, but a state of morbid tension exists in all the muscles of the trunk, extremities, head, and face; he comes awkwardly down on the soles of his feet, his arms are extended, the eyelids are widely open, the jaws firmly closed. Sensibility becomes blunted, so that irritation of the skin is not perceived until after some time. The paralysis of the insane is often more marked on one side of the body than on the other; but sometimes the progress of the affection varies, or even alters materially in either side.

35. *c.* If this complication be observed with attention, *two distinct stages* may be recognised: — In the *first,* the movements, although uncertain, retain a certain vigour — a rigidity of action, rather than power. This gives way, after a time, to the *second,* — to a relaxation — or a state of resolution, always increasing, of the muscular system. The patient becomes incapable of exertion; the features sink; the eyelids open sluggishly; the eye is dull; the jaws fall; the lips are pendant; and the excretions are involuntary. The patient is incapable of retaining a favourable position, and at last lies prostrate; the parts pressed upon by the weight of the body being excoriated, and ultimately gangrenous. In the course of this state of disease, attacks of cerebral congestion, followed by convulsions and coma, which continue for many hours, and are frequently repeated for several successive days, are often observed. After these attacks, the intellectual debility and aberration, and the paralysis, which are generally coordinate, are much more prominent. In many, variable periods, during which the symptoms are stationary, are interrupted by seizures of this kind, after which the malady proceeds rapidly, without ever retrograding, until the last degree of intensity is reached.

36. In the great majority of those who experience this complication, the paralysis does not commence until after the appearance of the intellectual disorder; but in some the insanity and palsy appear simultaneously; and in a few the muscular affection precedes the mental derangement. It should, however, be kept in recollection, that a general paralysis, similar in all respects to that now described, occurs, in rare instances, without being followed by insanity. I have seen several cases of this kind; and the circumstance has likewise been noticed by MM. DELAYE and FOVILLE.

37. iv. THE PHENOMENA EXHIBITED BY THE ORGANIC FUNCTIONS. — These functions present but little that is determinate, although they are rarely observed in a truly healthy state. Digestion is usually disordered in the earlier periods of insanity. The appetite is deficient or altogether lost; and more or less thirst is present. The mouth is clammy, and often dry; the tongue is white, with the papillæ often erect, or it is loaded

or slightly furred, or covered by a slimy mucus. It is often red at its point and edges. The salivary secretion is commonly scanty or frothy, but in a few instances it is increased, or frequently rejected. The *bowels* are more or less constipated, and the *urine* somewhat coloured. These symptoms very often disappear under an appropriate treatment, the mental disorder continuing even without material change; and the appetite returns, or is even increased. Sometimes the appetite is excessive from the commencement, although the other symptoms just mentioned are all present. Costiveness is the most general and persistent symptom, often continuing through the whole course of the malady.

38. The *pulse* is sensibly accelerated in the majority of cases. Authors have erred remarkably — even recent writers copying the blunders of those who have preceded them — in saying that the disease is unattended by any disturbance of the pulse. Rush found the pulse affected in seven eighths of his cases; and M. Foville observed a large majority of cases of uncomplicated insanity, with more or less acceleration of pulse, the mean pulsations in those examined by him being 84 in the minute. In comparatively few the pulsations were under 70, and in none were they below 60. The *heart's* action is attended by increased impulse in the majority of cases; and in a few it is tumultuous, irregular, or even intermittent. In some it is weak, and almost inaudible, or insensible to the touch. Organic change of the organ, in some one or other of its numerous kinds, is very common, especially in old cases of insanity. M. Foville states that he found some alteration or other of the heart in five sixths of the cases of insanity that he had examined after death during three years. But these changes are accessory, or not necessarily connected with the mental disorder: they are even, in many cases, produced by it.

39. v. Accessory Symptoms. — In all recent and acute, as well as in all prolonged cases, in which the symptoms have retained or assumed an acute character, obstinate *insomnia* is generally present. I have seen it often precede the mental disorder; and where the insanity presents an intermittent or paroxysmal form, it attends the accessions. This symptom is frequently most remarkably obstinate and prolonged; insane patients sometimes passing weeks or even months without the least sleep. When sleep is obtained, it is disturbed, dreaming, or wandering, or even raving. As to the symptoms furnished by the external aspect of the body, but little can be stated, as they vary with the habits and conditions of the patients, and the stages of the malady. In the great majority of cases, the expressions of the countenance correspond with the nature of the ruling passions, which manifest themselves with so much the more energy and truth, as nothing counteracts their operation. The eyes are unfixed, unsteady, wild, or timid, and incapable of returning a determined or steady look. The conjunctiva is injected, and the conchæ of the ears more or less red. The cheeks are not always coloured similarly to these two parts; for they may be either pale or red, or livid, whilst these present the highest degree of vascular injection. The skin is hot and dry, or hot and moist. The heat is greatest and most constant over the forehead, the extremities being frequently at the same time cold.

40. The co-existence of some important affection of the digestive, circulating, and respiratory organs with insanity sometimes imparts to the latter a modified or intermittent form. It is not rare to see phthysis breaking out during the progress of the mental disorder, and suspending it for a time. The patient in this case recovers his reason, whilst the pulmonary disease makes progress: but if this progress is arrested, the insanity returns; and these alternations often succeed each other until death takes place. Frequently an acute disease supervenes upon, and interrupts the course of, insanity, which reappears in all its severity after the accidental omplication has subsided. M. Foville thinks that this effect is oftener produced by acute inflammations of the chest than by those of the abdominal viscera. And lastly, an acute disease, thus occurring in the course of the mental affection, sometimes entirely suspends the latter, and is followed by complete recovery.

41. On passing in review the principal symptoms of mental alienation, disorders of the intellectual and moral powers only will be found constant. These disorders will often exist in persons whose sensations and movements are performed as regularly as in health; but they will also be frequently associated with morbid sensations, false perceptions, and delusions. In this latter case the conversation and actions of the insane will be as much the results of these sensations and perceptions, as the discourse and actions of reasonable persons are the results of external circumstances and rational inferences; the intellectual disorder then truly appearing to be chiefly the consequence of the affection of sensation and of perception. Where the mental alienation is associated with disorder of the voluntary movements, the connection between both is very different from that existing between the former and the sensations and perceptions. The voluntary movements are disordered as a contingent consequence of the lesion of the brain, that either is caused by, or occasions, the mental disorder; and are hence merely a complication, but one indicating a hopeless state of the malady. Lesion of voluntary movements, as described above (§ 32.), may, in rare cases, exist without insanity, but is generally consecutive upon, and an occasional complication of, disorder of the perceptions, or of the intellects, or of both the perceptions and intellects. This complication, moreover, merits the strictest attention in practice; for, where it exists, the perceptions and faculties are not merely simply perverted, but are, with the sensations, weakened, or even blunted. The memory is impaired; and association of ideas, whether true or false, is no longer vigorous. The affection of the intellects assumes an analogous state to the disorder of voluntary motion; the mental powers, as well as the muscles of volition, are universally weakened, and ultimately paralysed.

42. It is evident that the proportion of cases in which the mental disorder is simple, and of those in which it is associated with lesions, either of sensation and perception, or of motion, or of both, must vary with the numerous circumstances connected with the predisposing and exciting causes, and with the duration and treatment of the malady; that the proportion of each class in lunatic establishments, especially, will vary with the regula-

tions by which they are governed, and particularly with the restrictions as to the kind of cases admitted, the duration of the malady previous to admission, and the continuance of the patient under treatment. On this point, therefore, no precise information can be adduced. M. FOVILLE, however, states, that in an institution containing 334 insane persons, of whom 144 were men and 190 women, he found 214, of whom 94 were men and 120 women, presenting intellectual disorder without complication; 89, of whom 34 were males and 55 females, manifesting various disorders of sensibility; and 31, of whom 22 were men and 9 women, labouring under general paralysis. According to this account, the number of cases of simple intellectual insanity is the most considerable; the proportion of cases associated with deranged sensibility and perception, somewhat greater in females than in males; and the number of those complicated with general paralysis, was much greater in men than in women.

43. II. ARRANGEMENT OF MENTAL DISORDERS. — It is not more easy, satisfactorily to arrange the disorders of mind, than, in many instances, to determine the presence of disorder, and especially of that which is more strictly moral, the existence of which, if not always questioned, has been very generally overlooked, until contended for by a few recent authors.

44. The ancients divided insanity into *Mania* and *Melancholia*. By mania they understood a general delirium, and by melancholia a partial delirium. This division has descended down to a recent period, receiving, from time to time, some modifications, which have not prevented its being still adopted by some modern writers.

45. M. PINEL arranged mental diseases into — 1st, *Mania*, which he defines a general delirium with agitation, irascibility, and a propensity to furor; 2d, *Melancholia*, or exclusive delirium, with debility, moroseness, and a propensity to despair; 3d, *Demency*, or a particular debility of the operations of the understanding, and of the acts of the will; and, 4th, *Idiotism*, or a sort of stupidity more or less marked, with a nullity of character, and a most limited circle of ideas.

46. Dr. RUSH, in his excellent treatise on diseases of the mind, divided them into *partial* and *general*. He subdivided the *former* into — 1st, *Tristimania* (hypochondriasis and melancholia), in which a person entertains false ideas respecting his person, his affairs, and his condition, whereby he may be plunged in despair; and, 2d, *Amenomania*, in which the delirium is lively. The *latter* he subdivided into — 1st, *Mania*, or violent general delirium, with propensity to furor; 2d, *Manicula*, or a milder form of the preceding, or a chronic state of it; 3d, *Manalgia*, or a general torpor of the body and mind; 4th, *Dissociation*, or a state similar to the Demency of *Pinel;* and, 5th, *Fatuity*, or a condition generally denominated Idiotism by French nosographists.

47. M. ESQUIROL arranged mental disorders into — 1st, *Mania*, general delirium; and, 2d, *Monomania*, partial delirium. The term monomania conveys a clearer idea, and one more applicable to the diversity of cases of partial insanity, than the word melancholia. He applies, with great propriety, the term *idiotism*, or idiotcy, to congenital abolition of the mental faculties, and that of *dementia*, or *demency*, to accidental loss of them. M. GEORGET, adopting the division of ESQUIROL, added a fifth species, consisting of acute dementia, described by the latter as a variety only.

48. GALL endeavoured to connect the states of partial insanity to the respective fundamental faculties into which he divided the manifestations of mind. His pupil, SPURZHEIM, whilst he kept in view the doctrines of his master, admitted four states of insanity: viz. idiotism, dementia, alienation, and irresistibility.

49. Dr. M. BURROWS, extending the signification of the word insanity beyond most of his predecessors, has divided it into — 1st, *Delirium — delirium tremens;* 2d, *Mania — puerperal mania;* 3d, *Melancholia — suicide;* 4th, *Hypochondriasis;* 5th, *Demency*; and, 6th, *Idiotcy*. He observes "that delirium and hypochondriasis have better claims to be considered as distinct species than mania and melancholia. It is true that, if delirium be received only in its ordinary acceptation, as symbolical of intellectual disorder, it does not merit the rank of a distinct malady. But I think that there is ground to consider it as a frequent idiopathic affection, though certainly much more generally as sympathetic, and often as symptomatic." On this topic it is unnecessary to offer any remarks, or to do more than to refer the reader to what I said when discussing the *diagnosis* of DELIRIUM and HYPOCHONDRIASIS.

50. Professor HEINROTH has furnished a very elaborate arrangement of disorders of the mental faculties in his able work. He considers the derangements of the mind to be limited in number and in kind only by the diversities of the mental manifestations; and he bases his classification of these disorders upon two distinctions: the *first* is the difference which consciousness shows to exist in our mental operations; or which exists between — 1st, the feelings or sentiments; 2d, the understanding or reasoning powers; and, 3d, the will. The emotions of joy, grief, pleasure; the processes of reflection and contemplation; and the acts of the will or of self-determination; are *three* kinds of mental phenomena, which he considers to be so clearly distinguished from each other, as not to be confounded. According, therefore, as the cause of insanity is in relation to one or other of these kinds of mental manifestation, or as the disorder refers itself to either of these, or as it affects the feelings, the understanding, or the will, so it is placed in his classification, which consists of three classes of mental disorders, corresponding to these three departments of mental operation. The *second* distinction is derived from the character of the disturbance — whether it is that of exaltation or depression — of increased or diminished excitement or action.

51. Conformably with these bases of arrangement, the FIRST DIVISION consists of *disorders of passion, feelings, affections, and moral dispositions:* and presents *two forms*, viz. 1st, Of *exaltation*, or excessive intensity, giving rise to undue vehemence of feeling and morbid violence of the passions and emotions; and, 2dly, Of *depression*, or simple melancholy, or dejection without illusion of the understanding. The SECOND DIVISION comprises *disorders of the understanding or intellectual faculties*, consisting of two forms, the first of which is characterised by *exaltation*, or undue intensity of the imagination, producing mental illusions, or the several varieties

of monomania; the second, by *depression*, or feebleness of conception of ideas — by imbecility of the understanding. The Third Division consists of *disorders of the voluntary powers*, or of volition and the propensities; — the first form of which is characterised by *violence* of will and of propensity, or madness without lesion of the understanding; the second, by *weakness* or incapacity of willing, or moral imbecility. To these unmixed forms, Dr. Heinroth adds, under each division, others displaying combinations of several simple varieties. Thus, exaltation of feeling and of imagination constitutes derangement of the understanding with violent excitement or raving madness: delusion, with depression of feeling, constitutes insanity, with sorrowful dejection, or melancholy, &c.

52. M. Guislain, in his first able work on mental alienation, adopted, with very little change, the arrangement of Pinel. But in his more recent treatise, he has taken a more comprehensive and more original view of morbid mental affections, upon which he has bestowed the name *phrenopathies*, and which he has considered to proceed from an *exaltation*, or an *aberration*, or an *oppression*, or even from *exhaustion*, of the cerebral energies. These are the *four pathological conditions*, which he views as the *efficients* of mental disorders; and he arranges them as follows, — comprising, however, several affections not usually included amongst mental diseases, although sympathetically, or even more intimately, deranging the manifestations of mind: —

53. i. *Melancholia* or *Luperophrenie* (from λυπηρὸς, sad, and φρὴν, the mind), which he defines to be an exaltation of the feelings and sentiments to a state of sadness, and which he considers to exist at the commencement of almost all cases, and, with lesion of the sensibility, to constitute the fundamental character of insanity, appearing as one of the more important features of the malady. It frequently, however, assumes a monomaniacal, or, as he more correctly terms it, *monopathic*, form (from μόνος, single, and πάθος, disorder).

54. ii. *Mania*, or *Hyperphrenie* (from ὑπὲρ above, and φρὴν), which he views as a state of cerebral reaction, in which the whole or some of the active manifestations of the intellect, or traits of the character, or propensities, &c. are remarkably exaggerated and disordered. This species of insanity presents two states; — that of *erethism*, or tranquil mania; and that of *orgasm*, or furious mania. It may be partial — *monopathic*, or *monomaniacal*; or more or less general, as respects the extent to which the instinctive, intellectual, and moral powers are implicated. It may thus appear in the shape of ambitious, religious, lascivious, covetous mania, &c., assuming either a tranquil or a more or less furious character. The different forms of this species may be *associated* with *melancholia*, constituting *melancholic mania*.

55. iii. *Madness*, or *Paraphrenie* (from παρὰ, along with, and φρὴν), which he defines to be cerebral reaction characterised by fantastic aberration. This species presents numerous varieties and modifications as to the extent and association of mental disorder. But it is frequently partial or monopathic, and it may be either of a harmless or destructive nature. It is often *associated* with *melancholia*, or with *mania*, or with *both*.

56. iv. *Extasis*, or *Hyperplexie* (from ὑπὲρ, above, and πλῆξις, astonishment), which he views as sub-convulsive reaction of the cerebral power, characterised by immobility and rigidity. This state, although often monopathic, is also frequently complicated with *melancholia*, or with *mania*, or with *madness*, or with any two, or even all, of these.

57. v. *Convulsions*, or *Hypérspasmie* (from ὑπὲρ, and σπασμὸς, violent contraction). This species M. Guislain defines to be reaction, with muscular and mental agitation. He comprises under it tremor, convulsive syncope, chorea, hysteria, and epilepsy, — disorders previously not similarly classed, although either of them often *complicates* one or more of the mental disorders already enumerated, and even all of them, in rare instances.

58. vi. *Delirium*, or *Ideosynchysie* (from ἰδέα, idea, and σύγχυσις, confusion), which he states to be reaction and aberration of the ideas, wandering of the intellects, illusions, hallucinations. This may be *monopathic*, as when the patient is possessed by a single idea or illusion; or it may be *associated* with one, or more, or even with all, of the mental affections just noticed.

59. vii. *Incoherence*, or *Rêvasserie*, or *Anacoluthie* (from ἀνακόλουθια, incoherence). This state M. Guislain considers as different from delirium, inasmuch as in the latter the ideas run upon some illusion or hallucination, whereas in this state they arise vaguely, and without any connection with each other, or with any particular subject or object: nothing is expressed clearly or consecutively. In delirium, the idea, although false, presents some connection, or even the colours proper to it. Incoherence may be *monopathic* or *associated*; most frequently the latter; and the association may be with either of the preceding affections, or with several of them.

60. viii. *Dementia*, or *Noasthenie* (from νόος, intelligence, and ἀσθενία, debility). This state is viewed by M. Guislain as one of mental prostration and incapacity, in which the mental powers are palsied. This species is made to comprise those forms of insanity which consist of various grades of imbecility, original or acquired — congenital idiotcy and senile fatuity. Like the preceding species, it is either *monopathic* or *associated*, more frequently the latter, in which state it is usually the consequence of chronic or greatly prolonged forms of the disorders already enumerated.

61. I have thus fully adduced M. Guislain's arrangement of mental disorders, because it presents not merely a classification, but also an instructive analysis of them, especially when attentively considered in his own copious exposition. For practical purposes, and for the inexperienced practitioner it will be found deficient in simplicity: but coming as it does from one of the most experienced and ablest writers on mental alienation, it deserves our careful attention and our respect.

62. M. Foville, in attempting a physiological arrangement of mental disorders, observes, that *three orders* of phenomena, sensations, intellectual combinations, and movements, succeed one another in the actions of the nervous system; and that three orders of symptoms, exactly corresponding, show themselves singly or combined, in mental diseases. In founding upon the existence of the symptoms of a single one of these orders, and upon the successive appearance of those of the other two orders, he hopes to have laid, not only a physiological, but also an ana-

tomical basis of classification for the principal divisions of mental alienation, inasmuch as he thinks it may be admitted, at least with the consent of many modern writers, that sensibility, movement, and intelligence have each their distinct organic seat, although dependent upon the same system.

63. As *disorder of the intellects* is the most constant, the particular instances in which it is alone present constitutes M. Foville's *first division*, which comprehends mania, monomania, demency, and idiotcy, without complication with false perceptions, or with any disorder of the muscular system. In the *second division*, he arranges all cases characterised by the coincidence of disorder of sensation and perception with derangement of the intellects; and, in the *third division*, he comprises those which manifest that disorder of the muscular system, usually denominated general paralysis, or the palsy of the insane. In this third class he also comprehends the epileptic insane, as well as idiots, whose limbs are wasted and paralytic.

64. Dr. Prichard has distinguished insanity into —1st, *Moral*; and, 2d, *Intellectual*: the latter he has divided into — (*a*) *Monomania*, or partial insanity; (*b*) *mania*, or raving madness; and (*c*) *Incoherence*, or dementia. *Idiotcy*, or mental deficiency, he has considered as entirely apart from, or unconnected with, any form of mental alienation.

65. Dr. Mayo, in his *Pathology of the Human Mind*, divides primary mental disease into —1st, *Perversion*, or insanity; and, 2d, *Deficiency* of the mental manifestations. He subdivides *Perversion* of mind into —1st, *Moral* incoherency; and, 2d, *Intellectual* incoherency: and *Deficiency* into — 1st, *Brutality*, or absence of the moral faculty; and, 2d, *Imbecility*, or intellectual deficiency.

66. I shall not notice at greater length the divisions of the various forms in which mental disorder presents itself, that have been attempted by modern writers. Enough has been advanced to show the difficulty of the attempt, and to prove even (what many would endeavour to conceal) that one form of mental disorder gradually and insensibly passes into that more nearly allied to it, not only in distinct cases, but often also in the same individual: that, for instance, partial, may rapidly pass into general, insanity; that melancholia may quickly pass into mania, or mania rapidly lapse into melancholia, or that both may very frequently alternate; and that the more simple states of intellectual disorder may be soon associated with disorder of the sensations and perceptions, or be still further complicated with lesion of the movements, in the form either of general palsy, or of epilepsy, or even of both. Nevertheless, although even the most different forms of insanity more closely approximate than is generally imagined, still it becomes necessary to preserve and to recognise such distinctions between them as really exist, inasmuch as they furnish most important indications for moral as well as for medical treatment. In the division, therefore, which I shall attempt, I shall endeavour, at the same time, to point out close relations as well as obvious distinctions; and to follow the progress of mental disorder from its more simple, partial, and common forms, up to its more general and complicated states. Conformably with this intention, I shall take a brief view — 1st, of the Partial Forms of Insanity — (*a*) as evinced chiefly in the *moral manifestations* of mind, and (*b*) as affecting principally the *understanding* or *judgment*; — 2d, of the General Forms of Insanity — (*a*) in the state of *mania*, or raving madness; (*b*) in the states of *incoherence* and *imbecility*, or dementia; (*c*) in the state of *fatuity*, or annihilation of the powers of mind; — 3d, of Complicated Insanity — the insanity being associated (*a*) with *paralysis*, (*b*) with *epilepsy*, (*c*) with *apoplexy*, &c. — Connate and Puerile Insanity — *congenital privation of mind*, or *Idiotcy*, and *Puerile Imbecility*; Puerperal Insanity — *insanity during uterogestation, after parturition, and during lactation*; and Suicidal Insanity — *or suicide in relation to insanity*; will be considered in separate chapters of this article.*

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* The following *classification* of the manifestations and affections of mind, with reference to their influence in causing mental and corporeal disorder, was published some years ago by the author. It may be found of use in considering the different forms of mental disorder, especially in relation to their arrangement, to their causation, and to their moral management. This classification of the affections of mind is based upon the relations of the human species to the rest of the animal creation, especially in respect of those manifestations which are exhibited by the higher animals. The *Instinctive Desires and Feelings* form the First Class, as being the most generally extended; and the *Intellectual States* and the *Moral Emotions* constitute the Second and Third Classes, as belonging especially to man, and as furnishing him with a numerous class of ideas, which raise him above all other animals, which ennoble him in his social and moral relations, and which enable him to derive advantages from the past, to rationally enjoy the present, and to form the liveliest hopes, and even the firmest anticipations, of the future.

CLASS I. Instinctive Desires and Feelings. — Strong and immediate incentives to action in the lower animals, but controlled by reason in man.

Order I. *Instinctive Feelings, tending to preserve the Individual.*

a. The *sensations* derived through the medium of the external senses contribute to the preservation of the individual, by showing him what is injurious, and by enabling him to supply himself with what his internal sensations or appetites indicate to be necessary to his existence. — *b.* The appetite for food and drink. — *c.* The desire of preserving the animal warmth. — *d.* The desire of repose. — *e.* The desire of place. — *f.* The desire of pleasure and the dread of pain. — *g.* The desire of continued existence.

Order 2. *Instinctive Desires tending to perpetuate the Species.*

a. Parental and filial affection. — *b.* The desires of sex. — *c.* Desire of society and social feelings, giving rise to mutual support.

The *sensations* and *desires* are most powerful incentives of volition. —The appeasing of the *desires* is necessary, not only to health, but even to existence. The inordinate gratification of them is most injurious to physical and mental health, — is amongst the most fruitful sources of disorder of both mind and body.

CLASS II. Intellectual Powers, or States of Mind.

Order 1. *Powers of Consciousness, or the simple Intellectual States of Mind.* — Injurious to health, chiefly from their injudicious or excessive exercise.

a. Perception.—*b.* Attention—effects of protracted, to a single object, or train of investigation. — *c.* Conception — accurate or inaccurate views—their effects. — *d.* Memory. This last power is more or less concerned in a large proportion of the states of mind affecting the health.

Order 2. *Powers of Intellection, or the more active Intellectual States of Mind.* —The excessive exercise or misdirection of these is more or less injurious to mental and bodily health.

a. Simple suggestion or association of ideas. — *b.* Habit. — *c.* Imagination — its activity as influenced by the moral emotions of mind, sometimes beneficial, but oftener injurious to health. — *d.* Judgment, or reasoning. — *e.* Abstraction.

Order 3. *Ideas of Reflection, springing from the Exercise of the two former Orders of Powers.* — Rational incentives to action.

67. III. Of the special Forms of Insanity.— In the above general description, I have confined myself to the more obvious and fully developed states of mental disorder. It is necessary, however, that I should consider, in a more minute, yet succinct, manner, the specific forms in which aberrations of mind present themselves in practice, and more particularly those slight, moral, and partial states of disorder, to which I have as yet very imperfectly adverted.

68. i. Partial Insanity — *the simpler forms and slighter grades of mental disorder.* — Most authors have erred in viewing the more partial, or *slighter forms* of insanity, as consisting of derangement of one, or of a few, merely, of the intellectual or moral manifestations; or of a false perception, or delusion, by which the mind is constantly haunted, whilst the other faculties are unimpaired. I have already hinted (§ 3.) at the inaccuracy of this view; and stated that, although a single faculty or manifestation may be prominently disordered, or a single train of ideas be almost exclusively entertained, the other mental faculties are never in a healthy state, or very rarely retain their former energy. Conformably with this, the term, *partial insanity,* is not so applicable to the states of disorder about to be considered, as one which would imply a *slighter grade,* or a *simpler form,* of alienation. But as the former has been already employed by recent authors; and as it may be conveniently used, as implying slightness of grade, as well as an uncertain limitation as to extent; I shall retain it, and employ it synonymously with these expressions.

69. *A.* Moral Insanity— the *Monomanie sans Délire,* or *M. instinctive,* of M. Esquirol. — This state of mental disorder may be *defined* to be *a perversion of the natural feelings, affections, inclinations, temper, habits, moral dispositions or impulses, without any illusion or hallucination, the intellectual faculties being more or less weakened or impaired.* This state has been noticed by Heinroth and Guislain, and more fully by Dr. Mayo, M. Esquirol, and Dr. Prichard, in their recent works. Its earlier or slighter grades, however, have not generally been viewed as amounting to insanity; and, indeed, unless either the disordered manifestations, which I have just enumerated as constituting it, be remarkably prominent, or the intellectual faculties be much weakened or impaired, it cannot be really considered as amounting to mental derangement. Dr. Mayo has noticed, in his *Essay on the Relation of the Theory of Morals to Insanity,* a certain variety of it as belonging to insanity, and given it the name of *Brutality.* But in a more recent work he remarks, that further consideration has satisfied him, that to class it as such is loose and unphilosophical. He considers this as a distinct form of mental disease, especially in its fully developed or strongly marked form, and to be altogether distinct from the moral symptoms of insanity that occur at an early period of the disease, and that often afford, at that time, the only clue to its existence. By *Brutality,* — by the moral disposition to which this term may be applied, — he implies a destitution of principle; by *Insanity,* a perversion of tendencies and want of self-control. In the latter case, the patient cannot hear the voice of conscience; in the former, he has no conscience to hear.

70. The moral disorder, termed brutality by Dr. Mayo, is, however, only one of the modifications of moral insanity, comprised in the more extended definition which I have attempted to assign to this species of mental derangement, agreeably with the observations of Heinroth, Guislain, and Prichard; and is one arising

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a. Mental identity. — *b.* Time. — *c.* Power. — *d.* Causation and truth. — *e.* Right and wrong. — *f.* Existence of a Deity. — *g.* Immortality of the soul. All these are seldom injurious to health, but are often beneficial in controlling the emotions and desires, in governing and directing the instinctive feelings, and in enabling the mind and body to resist the influence of injurious impressions and agents.

CLASS III. Moral Affections of Mind, *in which some of our Instinctive Feelings, as well as of our Intellectual Powers, are frequently more or less engaged.*

Order 1. *The Instinctive or simple Moral Emotions of Mind,* often sudden and violent incentives to action. When strongly excited, or much indulged, they are amongst the most influential causes of both mental and corporeal disease.

a. Anger, indignation, resentment, revenge — their effects upon health. — *b.* Sympathy — its effects. — *c.* Beauty, or deformity, — *d.* Love and hate, jealousy, domestic misery. — *e.* Pride, vanity, and humility — the liability of the former to lead to insanity. — *f.* Gladness, regret, sadness, and grief: — Grief from lost objects of affection — its effects — counteracted by progeny: — Grief from moral degradation the least supportable — why? Effects of sudden shocks of grief on sensitive minds. Disappointments of the affections: — Grief from loss of fortune, &c. Influence of repeated disappointment and losses — of harassing difficulties. — *g.* Hope and fear — their effects on health. Confidence. Various anticipations — their effects. Anxiety; — that of professions, particularly of medicine. Anticipated happiness — effects of the sudden arrest of, on sensitive minds, &c. Terror, fright, &c. — often productive of nervous diseases, and sometimes of mental disorder. — *h.* Gratitude. — *i.* Wonder. Desire of novelty. Mental languor. — *k.* Sublimity and ludicrousness. — *l.* Love of approbation. — *m.* Desire of power and its related affections. Desire of Knowledge. Fame. Avarice.

Order 2. *Rational Emotions of Mind, arising out of moral and religious Obligations,* often strong incentives to action.

a. Rectitude, virtue, merit, and demerit, with all the duties we owe ourselves, as moral and responsible agents, and as tending to promote our intellectual and moral excellence and happiness. — *b.* Our various duties, as members of society. — *c.* Our religious obligations, as immortal beings. Remorse, or the consciousness of having neglected one or more of the above duties and obligations — sometimes productive of disorders of mind and body.

i. The influence of mental culture — intellectual and moral — when duly directed in early life, upon the temperament and constitution, — upon mental and bodily health, — in developing and in strengthening both the mind and body.
ii. Temperament and constitution remarkably modify the operation of the affections of mind upon health. Illustrations.
iii. The influence of mental and bodily occupations — 1st, upon mind; 2nd, upon the body.
iv. Ill effects of want of occupation—Ennui—Hysteria—Hypochondriasis — Melancholy — Insanity — Suicide. Effects of solitary confinement.
v. Bad consequences of improper occupations and amusements, especially in females in early life. — Mental dissipation — its effects, particularly in impairing — 1st, Mental vigour; 2d, Bodily health.
vi. Consequences of habitual amusements, sensual indulgences, and pleasurable excitements, on the nervous system. These generate feelings calling for their repeated gratification, and for increased excitement, until nervous energy and vital power are exhausted, and until moral and physical ruin ensues.
vii. Good effects of a well-regulated and cheerful mind on health — of agreeable pursuits, particularly those exercising both the mind and the body. — The influence of confidence — of moderation — of contentment — and of agreeable and useful occupations, in securing both the health and happiness of their possessors.

chiefly from the unrestrained indulgence of the passions and appetites. To it, however, I shall more fully advert in the sequel. In respect of moral insanity, in its more extended signification, it is justly remarked by Dr. Prichard, that there are many persons living at large, who are affected, more or less, with this modification of mental disorder, and yet are reputed to be merely of a singular or wayward character. An attentive observer will often recognise something remarkable in their manners and habits leading to doubts of their entire sanity; and circumstances often appear which strengthen the suspicion. An hereditary tendency to madness may have existed in the family, or various members of it have been subject to diseases of the brain. The individual himself may have been the subject of an acute attack of insanity, or of inflammation of the brain, in a former period of his life; and from that time, or after having sustained some reverse of fortune, or the loss of a beloved relative, his temper and dispositions have undergone a change. This alteration of character may likewise have followed some dangerous illness or severe shock of constitution, especially fever, phrenitis, paralysis, apoplexy, or epilepsy. In some, the alteration in the temper, in the passions, the habits, or the disposition, may have been gradual or imperceptible; in others, sudden, or almost immediate upon its determining cause. In either case, it seems to have consisted chiefly of an exaltation of peculiarities or dispositions, more or less natural or habitual to the individual. In this state, a person may continue for years, following the bent of his perverse inclinations; always engaging in new pursuits, and soon relinquishing them, without any sufficient object or inducement excepting caprice. At length the total perversion of his affections, and dislike, or even enmity, to his dearest friends, excites alarm.

71. *a.* When the head of a family is affected with this ambiguous modification of insanity, it often becomes necessary, to prevent ruin from absurd extravagance or wild projects and speculations, to make some attempt at taking the management of his affairs out of his own hands; but for this the laws are inadequate, and the endeavour is often unsuccessful. Persons labouring under this disorder are capable of reasoning upon any subject within the sphere of their knowledge, and often display great ingenuity in giving reasons for their conduct, or in justifying their moral feelings. In these cases, as well as in others belonging to other modifications of this species of insanity, the feelings and passions are more or less excited, whilst the controlling faculties of reason and judgment — of attention and comparison — are equally weakened, errors in action and conduct resulting therefrom.

72. Moral insanity is not, however, limited to a preternatural excitement of the passions and temper, but comprises many other disordered states of the mind. Indeed, its varieties are almost as numerous as the modifications of disposition and temper. The most frequent forms are characterised, either by the kind of excitement just noticed, or by melancholy dejection. Either of these forms of moral disorder may continue more or less permanently; but they sometimes alternate or supersede each other, an opposite state of temper or feeling arising without any obvious cause. The prevalent character of the affection is occasionally derived from the natural disposition of the individual; but it is often remarkably different,— lively persons becoming dejected; and the melancholy or taciturn, lively, loquacious, or sanguine.

73. *b.* When *sorrow* or *gloom* is natural to an individual, and is not excessive, it does not amount to disorder; but, when it is remarkable and constant, without any real cause, it becomes a moral disease, although entirely devoid of any illusion or hallucination. Dr. Prichard remarks, that this tendency to morbid sorrow and melancholy, as it does not destroy the understanding, is often subject to control when it first arises, and probably receives a peculiar character from the previous mental state of the individual, from his education, and his religious or irreligious character. Persons of well regulated minds, when thus affected, express grief and distress at their conscious inaptitude to the active duties of life; and often feel a horror of being driven to commit suicide, or some dreadful crime to which they feel various obscure impulses or tendencies. This idea haunts them, and renders them fearful of being a moment alone. It, however, generally subsides, and a healthy state of mind returns. Persons of an opposite character frequently relapse into a state of *tædium vitæ*, or of morose disgust; loathe their very existence, and at length attempt to end it. A state of gloom and melancholy may, however, give way to a state of morbid excitement.

74. *c.* When the moral disorder is one of *unnatural excitement*, the person affected is full of projects and enterprises, or is active and boisterous, beyond the limit that belongs to a naturally lively disposition. This state of disorder may occur in persons whose temperament is the reverse of either the sanguine or lively; and it then becomes the more striking. It usually displays itself in a want of self-government, in continual excitement, an unusual expression of strong feelings, in thoughtless and extravagant conduct. A modest female becomes violent and abrupt in her manners, loquacious, impetuous, talks loudly and abusively of her friends or relations before entire strangers; or uses indecent expressions, and betrays, without reserve, unbecoming feelings and trains of thought. Persons thus affected often become drunkards; and a debauch is followed by raving madness, requiring restraint or confinement, which, with abstinence, removes, for a time, the maniacal excitement; but as soon as restraint is withdrawn, they resort to their former excesses, although well aware of the consequences. This form of the disease I have met with in two instances in professional men.

75. *d.* In examples of a different description, as Dr. Prichard remarks, the mental excitement constituting the disorder is connected with *religious feelings*, especially when the period of excitement has been preceded by one of melancholy, during which the person affected has laboured under depression and gloom, mixed with apprehensions as to his religious or future state. Formerly possessed by a dominant sense of condemnation and abandonment, when all hope and comfort have vanished, and nothing has mitigated the gloom and sorrow of the present, or allayed the dark and fearful anticipations of the future, his feelings become suddenly changed, and he

experiences a lively joy in his contemplations, amounting often to rapture and extasy. Such a change is hailed by the devout as a happy transition from religious destitution to divine acceptance and grace. But the train of excitement is too high, the expressions of happiness too extatic, to be long mistaken; pride and haughtiness, a violent or boisterous deportment, and selfishness, are soon betrayed, with want of natural affection, variability of spirits, and irregularity of mental habits and of conduct. In these cases, there is no false sensation or perception impressed upon the understanding; no illusion or belief of a particular sentence of condemnation, or message of acceptance, specifically revealed. If this existed, the case would be one, in which the moral disorder is only the consequence of a false perception or delusion, and consequently one which belongs to another species of mental disease.

76. *e.* Particular cases are marked, as noticed by Pinel, Esquirol, Holland, and Prichard, by the prevalence of *certain passions* and *mental habits*, displayed under modifications, of which the human mind, in a sane state, seems hardly to be susceptible. Amongst these is an unusual prevalence of angry and malicious feelings, arising without provocation or ordinary excitement, constituting what Pinel designates, "*Manie sans Délire.*" There are many instances, observes Dr. Prichard, in which the whole diseased manifestation has consisted in a liability to violent fits of anger without cause, and leading to danger, or actual commission of serious injury to surrounding persons. The characteristic feature of this malady is extreme irascibility, depending on a physical morbid cause. There are other instances in which malignity has a deeper dye. The individual is continually indulging enmity and plotting mischief, and even murder, against some object of his malice. When this is connected with the false belief of some personal injury actually sustained, the case does not fall under the head of moral insanity. It involves hallucination or erroneous conviction of the understanding; but when the morbid phenomena include merely the expressions of intense malevolence, without provocation, actual or supposed, the case is strictly one of moral insanity.

77. *f.* In some instances, the *impulses* and *propensities* to which the patient is subject, or which he has indulged, are so exalted or disordered, as to constitute the sole manifestations of insanity, as ably insisted upon by Reil, Hoffbauer, and Prichard. A sudden impulse to commit an atrocious act may arise in the mind of a person otherwise apparently sane, and in possession of his intellectual faculties; and be resisted by reason and self-control, on each of many occasions of its successive occurrence. At last the patient either may doubt his own powers of control, solicit the interference of his friends, and submit himself to restraint; or he may, at last, be unable to resist the impulse. In other cases, crimes have been perpetrated without any fixed object or motive, and the punishment of the law has overtaken the victim of disease. Insane persons may display their states of mental disorder by a propensity to commit every species of mischief, although devoid of any feeling of malevolence. A propensity to theft is frequently a feature, and often the characteristic one, of moral insanity. In some, it may be nothing more than eccentricity of character, as Dr. Prichard supposes, but it is more commonly associated with other manifestations of mental disorder, when actually amounting to moral insanity, and is to be viewed in connection with the individual's position in society, with his previous habits and character, and with the existence or non-existence of mental derangement in any member of his family.

78. *g. Moral Insanity* — the *Manie raisonnante* of Pinel — the *Monomanie raisonnante* of Esquirol — is often manifested, especially, by the singular, absurd, and exceptionable nature of the actions, intentions, and propositions of those affected by it. Persons thus disordered are turbulent, unsociable, and engaged constantly in affairs which are blameable, ridiculous, and contrary to their former habits, to their real interests, and to the interests of their families. Their moral character is altogether perverted, and they become dangerous chiefly to themselves and to those depending upon them, owing rather to the consequences, than to the nature, of the actions which they commit. Although engaged, or entering upon, what compromise their interests and character; or abandoning the objects of their affection, or quitting their families or affairs; they argue strongly in support of their conduct. Whilst there is a change or total perversion of the habits and affections, there is also sufficient power of intellect to attempt a justification of the sentiments and actions they have espoused.

79. *h.* Moral insanity has been viewed by M. Esquirol as presenting either an *acute*, or a *chronic* course; and he believes that it may be divided into *three stages*: — In the *first*, the character and habits are changed; in the *second*, the affections are perverted; and in the *third*, maniacal excitement, or violence of the temper or passions, with degradation of the faculties, more or less rapidly ensue. It may assume a remittent or intermittent course; and, after recovery from it, relapses are very frequent. If uncontrolled, it often passes into, or becomes complicated with, one or other, or even with more than one, of the other forms of insanity about to be distinguished, and even also with palsy.

80. *i.* The variety of insanity, termed *Senile Insanity* by Dr. Burrows, as occurring in old age, often assumes the form of moral insanity, but more frequently that of general imbecility. In the former case, it consists in a morbid excitement of the passions, and a remarkable perversion of the temper and propensities — in a change in the whole moral character, without any hallucination or false perception, the existence of which would constitute it a different species of mental disorder.

81. A variety of instances, as Dr. Prichard observes, is mentioned by writers, in which the unusual intensity of particular passions or emotions has been thought to constitute mental disease, and compound epithets have been applied to these states of the mind and its affections. *Nostalgia*, and *erotomania*, have been considered as disorders of sentiment; *satyriasis*, and *nymphomania*, of the physical feelings. The excessive intensity of any passion is disorder in a moral sense. It may depend physically upon certain states of the constitution; but this does not so clearly constitute madness as the irregular and perverted manifestation of desires and aversions. This form of in-

sanity has undoubtedly been the source of moral phenomena of an anomalous and unusual kind, and of certain perversions of natural inclination, which excite the greatest disgust and abhorrence. Besides these, however, there are others, to which I may also more particularly advert, and which are noticed by M. ESQUIROL as constituting forms of monomania, under the designation of *Monomanie d'Ivresse*, of *M. incendiaire*, and of *M. homicide*. There may be doubts of the propriety of considering these, or even *erotomania*, as forms of insanity. But it is difficult, in respect of the mental manifestations, as well as of the bodily functions, to draw the line of demarcation between health and disorder; and there can be no doubt that the excessive excitement of any particular passion, sentiment, or emotion, or the undue predominance of it for an unusually long period, or the uncontrollable impulse or desire to appease or to gratify any appetite, amounts to moral disorder, which becomes the more manifest and indisputable, as it is the more freely indulged. As long as reason restrains the appetites, passions, and emotions, within the conventional limits prescribed in society, and is competent to the decided exercise of this sway, moral disorder cannot be said to exist; but when it loses this salutary influence, and in proportion as it is incompetent to exert such influence, either from the violence of passion, or the weakness of the understanding, the mental disorder is the more evident.

82. *α*. *Erotomania — Monomanie érotique* of ESQUIROL — is *characterised by an excessive love of some object, real or imaginary.* — It is a mental affection in which amorous ideas are as fixed and dominant, as religious ideas are in religious monomania or melancholia. Erotomania is very different from satyriasis and nymphomania. In the latter, the mischief is in the reproductive organs; in the former, it is in the mind. The one is a physical, the other a moral, disorder. Erotomania is the result of an excited imagination, unrestrained by the powers of the understanding; satyriasis and nymphomania proceed from the local irritation of the sexual organs, reacting upon the brain, and exciting the passions beyond the restraints of reason. In the former, there is neither indecency nor the want of chastity; in the latter, there is unrestrained expressions of sexual desire and excitement. The one is commonly caused by ungratified, or disappointed, affection excited in a virtuous mind; the other, by inordinate irritation or indulgence of the sexual passion.

83. In erotomania, the eyes are bright, the manner and expressions tender and passionate, and the actions free, without passing the limits of decency. Self and selfish interests are all forgotten, in the devotion paid, often in secret, to the objects of the mind's adoration. A state of extasy often occurs in the contemplation of the perfections which the imagination attaches to the subject of its admiration. The bodily functions languish during this state of moral disorder; the countenance becomes pale and depressed; the features shrunk; the body emaciated; the temper inquiet and irritable; and the mind agitated and despairing. The ideas continually revert to the loved and desired object; and opposition, or endeavours to turn them in a different direction, only render them more concentrated and determined in their devotion. At last, parents and fortune are abandoned, social ties broken asunder, and the most painful difficulties are encountered, in order to obtain the object of admiration.

84. In some cases, the attempts made by the patient to conceal and to overcome this affection, occasion a state of irritative fever, with sadness, depression, loss of appetite, emaciation, &c., which has not inappropriately been termed by LORRY *Erotic Fever;* and which, after continuing an indeterminate period, may even terminate fatally. When a young person becomes sad, absent in mind, pale and emaciated, sighs frequently, sheds tears without any obvious reason, is incapable of mental or bodily exertion, scarcely speaks to any one, loses appetite, &c., it is sufficiently evident that the mind is inordinately possessed by some desired object. If a strong effort be not made to dispossess it of the predominant sentiment, or if the object of desire be not obtained, the symptoms become still more distressing. The corporeal functions languish, the eyes sink, the pulse becomes weak and irregular, and the nights disturbed and sleepless. At last a form of slow hectic is produced; and the weaker organs, especially the lungs and heart, are the seat of slowly produced disease; the whole frame is blighted, and the patient sinks from the injurious influence of the mental affection on the vital organs.

85. This form of moral disorder may increase, and affect the intellects in a much more serious manner, until general insanity or mania is developed; and, with the progress of time, it may at last terminate in dementia or incoherent insanity. In each of these, the primary character of the disorder, or the original moral affection, will still continue to be manifested by the frequent suggestion of the same train of ideas, or recurrence to the object of devotion.

86. *β*. *The irresistible propensity to intoxication —Monomanie d'Ivresse* of M. ESQUIROL — may be viewed as actually constituting a variety of moral insanity, and indeed has been thus considered by the able and experienced writer just named. There can be no doubt of early advances of partial as well as of general insanity being sometimes indicated by an irresistible impulse to indulge in intoxicating liquors. And this impulse may be connected with a physical or corporeal feeling, rendering it still more irresistible, especially to persons of weak character. In many cases, indeed, the insanity is not so much caused by the intoxication, to which it is so frequently imputed, as the impulse to indulge it is a symptom of the incipient mental disorder. This is especially the case when a person, previously temperate, suddenly addicts himself to the use of intoxicating liquors, and particularly of ardent spirits. Sometimes, at the commencement of insanity, the state of the stomach, and even of the whole vital organs, is such as to be attended by an irresistible craving for stimulating fluids — by a kind of *pica*. This craving and the mental impulse accompanying it are generally suddenly developed; and occasionally, after having been appeased and gratified, they do not again return until after some time. Moreover, at this period of the mental disorder, the moral powers are weakened, and the mind altogether enfeebled and incapable of sufficiently resisting the morbid impulse, which is usually also attended by ennui, irritability, painful sense of sinking at the epigastrium, and restlessness. The desire to appease this

instinctive craving is, at last, imperative. When gratified, the patient becomes violent, maniacal, and dangerous to himself and to those around him. He continues to swallow the intoxicating fluids as long as he can procure them, or as long as he has the power of doing so, until the paroxysm terminates. As the patient becomes sober, the maniacal turbulence often subsides, but it frequently continues for some time afterwards, often for many days, with signs of more or less vascular excitement of the brain and its membranes; and, in many cases, when he can revert to the means of intoxication as he becomes partially sober, the insane violence is very considerably prolonged. At last the paroxysm terminates, and the craving for exciting liquors is no longer felt. Instances have even occurred of these liquors being afterwards loathed, until another paroxysm took place. M. Esquirol met with a case of mania consequent upon intoxication, which was followed by a distaste of all fermented and distilled liquors for ten years afterwards. Some persons, unable to withstand the impulse to intoxication occasioning fits of insanity, have solicited the restraint of friends; and others have committed suicide when they found themselves unable to resist the morbid impulse.

87. This state of moral disorder, whilst it gives rise to fits of maniacal excitement, aften also occasions more permanent mania, and even dementia. The maniacal paroxysms, when thus excited in females, are frequently associated with hysterical symptoms; and when mania or dementia is consequent upon it, palsy is not an infrequent complication.

88. *γ. Incendiarism is sometimes an act of partial insanity — Monomanie incendiaire* of Esquirol — *Pyromanie* of Marc. (*Ann. d'Hygiène*, t. x. Paris, 1833.) — It is, however, more generally one only of the modes in which an evil or mischievous propensity manifests itself, when excited by envy, jealousy, or revenge, in the minds of persons unrestrained by reason and by the laws. Yet instances are recorded by Henke, Esquirol, Marc, and others, of persons being impelled to the commission of this act by an irresistible impulse, which their will was incapable of overcoming. Most of these cases have occurred in girls and young women, who were either pregnant, or disordered in the uterine functions. Several of them presented signs of increased determination of blood to the brain; and some manifested other signs of insanity, either with, or without, illusions or false perceptions. M. Esquirol concludes, from the history of cases of this kind, observed in France and Germany—1st, That mental alienation, whatever may be the character of the delirium, determines some insane persons to commit incendiarism; and, 2dly, That there is a variety of monomania without delirium (without hallucination) characterised by an instinctive impression — an uncontrollable impulse — to commit this crime.

89. *δ. Homicidal Insanity — Monomanie homicide*, Esquirol — *Fureur maniaque*, Fodéré — *Manie sans Délire*, Pinel. — Murder, or attempts to murder, are made by insane persons — 1st, When impelled by an involuntary impulse, or instinctive desire, which they are unable to resist; 2dly, When actuated by motives on which they are capable of reasoning, and whilst conscious of the evil they have committed; 3dly, When influenced by illusions, hallucinations, or false perceptions; 4thly, When excited by passion or opposition; 5thly, When they believe that they are opposing an enemy, against whom they should defend themselves; and, 6thly, When the intelligence is so prostrate as to be incapable of distinguishing right and wrong, and when they act from imitation. It is respecting the *first* and *second* of these — the former especially — that I now proceed to offer a few remarks.

90. Persons who appear to enjoy reason, but whose active moral powers — whose affective functions of mind, in the language of French pathologists — are disordered, must, conformably with what I have advanced, be viewed as insane. These persons perceive, compare, reason, and judge correctly of matters, but they are influenced by the least cause, or even without any object, to acts of violence. They are irresistibly, or instinctively, impelled, with a full consciousness of their state, to commit the crime they most hate. They deplore their situation, and give warning to guard against their fury, or to deprive them of the power of committing the dreaded act.

91. But the question has been long since and often proposed — Is there really a form of insanity in which a person may enjoy reason unimpaired, and yet commit the greatest of crimes? M. Esquirol formerly answered this in the negative; and stated, that of the partially insane, who appear to enjoy their reason, and to deplore the determinations by which they are so strongly impelled, all admit that they have felt something internally or mentally at this time, of which they could give no clear account; that their brains were embarrassed; that they experienced more or less difficulty — often an inexpressible difficulty — in the exercise of their judgment; and that this was preceded by physical symptoms which they perfectly recollected. One felt a burning heat or a pulsation in the head; another, a lacerating or a sharp or acute sensation rising from the abdomen to the interior of the cranium; a third, a momentary illusion or hallucination; or a fourth was betrayed by an erroneous process of reasoning. One person suddenly becomes red in the face, imagines he hears a voice addressing him, and acts according to the injunction he believes imposed on him, or to the call addressed to him. A husband is persuaded that his wife is unfaithful to him; and, although every circumstance is considered by him, and found to militate against the truth of the persuasion, yet, in a moment when the jealous feeling gains the ascendancy, an act of murder is committed. The mother of a family believes that her situation is distressing, and that her children will be reduced to mendicity. In a fit of despair she forms the resolution of destroying them, in order to preserve them from a calamity which she considers greater than death; but in the moment of her attempting it, maternal tenderness, speaking louder than despair, exclaims, "Protect my children from me!"

92. All these instances may be referred to a momentary delusion or hallucination, under the influence of which crimes or insane actions may be committed, after which a lucid period occurs. But there are other instances which cannot be thus explained, and which do not altogether warrant the conclusion at which M. Esquirol arrived in his earlier work; and of this he is aware in his more recent production, for he there admits that,

although partially insane persons are often betrayed by their delirium or their hallucinations into the commission of homicide, yet there are others who commit the crime from an instinctive or irresistible impulse. In the former class of insane homicides, the understanding is disordered, under the influence of false perception, or of a delusion momentarily entertained, and the insane person acts under an error of judgment; but, in the latter class, reasoning and judgment are altogether suspended, and the insane impulse impels and directs the will, without any effort of the understanding or of the moral powers to prevent the act. An individual thus affected acts uninfluenced by delirium, or delusion, or emotion, or passion, and almost without consciousness, impelled by an instantaneous, blind impulse, independent of the will, and before which reason and judgment are for a moment entirely prostrate. This constitutes the paroxysm of monomania without delirium of the French writers. Of this affection I have met with three instances. In two of these, however, there was more or less disorder of the digestive organs; and in the third, a female, the catamenia were disordered; but there was no other indication besides this of mental alienation. This subject is most important, and is, moreover, very intimately related to *suicide*, inasmuch as the morbid impulse to destroy one's self is similarly manifested, as will be shown in the sequel, and much more frequently than the impulse to destroy another. Yet has it been nearly overlooked by most writers, and especially by those of this country, notwithstanding the growing increase of both crimes, and the evidence furnished, by a careful inquiry into their remote causes, of a progressive increase of them being likely to result. Homicidal monomania most frequently occurs in persons of a sombre, melancholic, or capricious disposition; but it is also met with in those who are remarkable for the amiability of their tempers and manners. The state of the atmosphere, disorder of the digestive and excreting organs, excitement of the nervous system, a vicious education, the reading improper books, and accounts of crimes, suicides, &c., unsound and exalted religious sentiments, the influence of imitation, chagrin and disappointment, want, &c., are chiefly concerned in developing this moral distemper. A very few instances from among many will illustrate this state.

93. The mother of four children was suddenly seized with the desire of killing them, and flew from her house as the only way of preventing the commission of the act. A maid, on each occasion of her dressing the infant committed to her care, was seized with an uncontrollable desire to murder it. A man experienced repeated impulses to murder his wife, to whom he was warmly attached, and was prevented on one occasion from attempting it by an accidental occurrence. He applied to the author for advice, and to be placed under restraint. He was at that time apparently well, and capable of pursuing his usual avocations. A person, after reading the horrible details of a murder, which was circumstantially narrated by the daily and weekly caterers to the most depraved passions of the multitude, was suddenly seized with an impulse to kill his wife. It has been observed in France, in Germany, and in England, that the publicity given to the particulars connected with a murder has been followed, within a few days, by several attempts to commit this crime.

94. Although various moral causes combine, in some cases, to predispose the mind to be influenced by the insane impulse to perpetrate this and other crimes, yet it will be found, in most, if not in all, instances, that the person thus *morally* affected is also *physically* disordered, if the examination be made with sufficient care, and with the requisite knowledge of the several manifestations of gradual and insidious disease of the brain and of the abdominal organs. A most attentive examination of the various functions of the brain and of the senses connected with it — of the temperature and circulation of the head — of the functions of those viscera which most readily sympathise with the brain, and which so powerfully influence both its actions and its circulation, and even of the appearances of the tongue, and of the several excretions — will generally disclose more or less disorder in one or more of these quarters, and prove, that although there may not be very obvious disease, there is lurking mischief, either primarily or consecutively, but always most seriously, affecting the brain. In the slighter and more incipient states of morbid action in this organ, the general and local sensibility and the circulation often betray little or no disturbance, and indeed the whole amount of physical disorder may be so small as to escape the detection of all, excepting the closest observer, who, from experience, will look for it, and detect it, more readily in the sympathies, and in the symptomatic affections, of remote parts, than in disorders of more closely related organs. It is reasonable to infer, that when capillary action in the brain is slightly but very generally disordered, and especially when this disorder commences gradually, and almost imperceptibly, and proceeds slowly and insidiously, those manifestations of mind which are of the highest order in the scale of mental development will be the earliest and most seriously deranged; and that, as the physical disorder proceeds or extends, the other orders of mental operation — the *intellectual* and the instinctive (see *Classification* at § 66.) — will become successively implicated, until the various phases of moral and intellectual insanity are passed through, and instinctive insanity, or fatuity, is ultimately reached.

95. *B.* PARTIAL DISORDER OF THE UNDERSTANDING — *Amenomania* of RUSH — *Monomania* of ESQUIROL — *is characterised by false perceptions, illusions, or erroneous convictions, referring to one or a few subjects merely, or involving chiefly a single train of ideas, and so impressing the mind as to partially disorder the judgment.* Partial insanity of the understanding may exist — 1st, *In a more or less simple form;* or, 2dly, *Associated, or complicated, with moral insanity.* Indeed, most of the instances in which crimes are committed in the insane state present this latter form. Even the more simple states of monomania of the understanding may be said to be insanity with reference to a small number of subjects, rather than to one subject only; since the number of persons who are insane upon a single subject merely is comparatively few. Most of the cases usually denominated monomaniacal are those which present some predominant idea, or hallu-

cination, amidst other indications of mental weakness or disorder, as I have already contended (§ 68.).

96. This species of insanity was distinguished by the term *melancholia*, from the age of Hippocrates, till M. Esquirol imposed upon it the name of *monomania*. As the former expression suggested the idea that partial derangement of the understanding is essentially connected with sadness and despondency, and as this is not the case, the latter term is much less exceptionable, although not always strictly applicable, for the reason just assigned. The expression, therefore, which I have made use of at the commencement of this section is more applicable to the different states of this species of derangement, than any single word that can be employed. Although the illusions which possess the minds of persons partially insane are as varied as the operations of the intellect, yet they very frequently are productive of either happiness or distress to the patient. Hence they admit of being divided into those which are pleasurable or exciting, and those which are gloomy or depressing, — a division, indeed, which has been adopted by Rush and Esquirol. Still there are some predominant ideas, which do not necessarily produce either happiness or misery, but which may be contingently associated with either, or with each alternately. Indeed, many persons become insane upon some metaphysical or abstract subject, on which they talk absurdly, but without any disposition to grief or to elevation of mind. It should also be remarked, that M. Esquirol has comprised under monomania those states of moral disorder already noticed, and which have been excluded by Dr. Prichard, under the belief that they are unconnected with any illusion or hallucination. But, as I have already contended, the judgment is more or less impaired in these states of moral disorder, although not to such an extent, or in such a way, as to give rise to a precise morbid perception, or perversion of the understanding; and self-control is remarkably weakened.

97. The forms of partial insanity of the understanding have been distributed into many orders or kinds. The subdivisions would be endless, if it extended to as many different kinds as there are modes or varieties of hallucination; at most a division can be founded upon the prevailing passions or emotions, which give origin, and impart their peculiar character, to the disorder; but even this would be too extended. It might, therefore, be sufficient to arrange them into — 1st, Those characterised by exaltation or excitement; and, 2dly, Those evincing more or less depression. This arrangement, however, would exclude more than one of the varieties of mental disorder which fall under the present head, or of those hallucinations which are not necessarily connected with either exaltation or despondency, and which yet may be attended by either. It will be preferable, therefore, after having taken a general view of this species of insanity, to notice more particularly the chief forms which it most frequently assumes.

98. *a*. General View of Partial Insanity. — The remark already made (§ 68.) as to moral insanity, is also applicable, and even more so, to partial disorder of the understanding; and this is, that the mind is not perfectly sound on subjects unconnected with the particular impression by which it is possessed and more prominently disordered. There are certainly cases in which the understanding seems quite rational on all topics, excepting those connected with its illusion or hallucination; but, even in these, it will be found, on closer observation, more or less weakened or impaired, owing to deficient powers of attention and comparison. The individual affected is certainly, in ordinary circumstances, calm, and devoid of those signs of perturbation and constant excitement characterising mania, or raving madness. But it will be found, that his habits and disposition have been long more or less changed; that he has presented a greater or less degree of moral insanity; that his powers of application and attention have been weakened for some time; and that an erroneous belief or illusion has gradually arisen in the course of these disorders. Very frequently a settled or habitual despondency, or melancholy, or moroseness of temper, or even a sullen misanthropy, has existed, has slowly increased, and has disordered and perverted his feelings and affections. Ultimately some delusion supervenes, which may at first be fugitive, but which afterwards becomes more fixed and constant.

99. *a*. Dr. Holland very justly remarks, respecting the commencement of the slighter forms of partial disorder of the understanding, that many persons have felt, at one time or other (oftenest, perhaps, during the " severa silentia noctis"), some dominant idea or feeling to possess the fancy, retaining its hold with a sort of malignant power, despite all efforts to shake it off; and, by degrees, distorting the subject, especially if it be a painful one, into a thousand false and alarming forms. If this train of thought be interrupted, and time, society, and other objects, come in between, the mind is conscious of passing, as out of a bad dream which for a while had overshadowed it. But let there be a cause for the continuance of this state, and we have an approach to monomania in some of its various shapes; nothing apparently wanting but the intensity, which is often so singularly testified in these cases by the actions induced, and by the long duration of the delusion. Pinel mentions instances where the same single insane impression continued without change for twenty or thirty years.

100. The illusion which torments the monomaniac is generally something bearing a near relation to his former habits of business, or to the usual occupation of his thoughts. In fact, the long persistence of the mind in one idea or feeling, not duly broken in upon, or blended with others, is, as Dr. Holland well remarks, a state always leading towards aberration. Indeed, the common, and often the only, evidence of insanity, especially in its earlier stages, is that drawn from the dominance of a single impression, faulty, perhaps, only in the absence of those which should modify and correct it. It may be alleged, that this reasoning tends to remove all distinction betwixt the sound and unsound mind, and to reflect madness back, as it were, upon the healthy and natural state of the faculties of man. But this is not truly so. The extremes are widely apart, and are readily recognised. It is only in the slighter states of divergence, where mental health is lapsing into disorder, that marks of practical

distinction may be difficult, or misunderstood. The existence of more doubtful cases, graduating between reason and insanity, is but a part of that law of continuity, which pervades both the moral and the physical world; and which, although furnishing difficulty to the legal consideration of insanity, yet should present but little to the adoption of appropriate moral and medical treatment.

101. It is often difficult to account for the occurrence of the hallucination disordering the understanding. But, as just observed, the illusion entertained is generally connected with the former habits, business, and opinions of the patient. Dr. PRICHARD remarks, that an individual of a melancholic temperament, long influenced by circumstances impairing his health and calling into play the morbid tendencies of his constitution, sustains some unexpected misfortune, or experiences great anxiety, becomes despondent, and broods over his feelings, till the prospects of life appear to him dark and distressing. His inclinations now are so altered, that no motive can rouse him to exertion; his gloom and despondency increase; his imagination fixes upon some particular circumstance of a distressing nature, and this becomes afterwards the focus round which the feelings which harass him concentrate themselves. This circumstance is often some real, occasionally some trifling, act of delinquency, for which the patient expresses the strongest, and perhaps disproportionate, self-condemnation. In other instances, an unusual phantom suggests itself, in harmony with the prevalent tone of the feelings; and this at first haunts the mind as possible, and is at length admitted as reality. Some individuals begin by indulging morose or malignant feelings to their acquaintance; and, by magnifying in imagination every trifling neglect into a grievous contumely, they fancy at length that they find, in some casual occurrence, glaring proofs of premeditated designs to ruin them and expose them to the contempt of society. The disease in these cases has its real commencement long before the period when the particular delusion, which is only an accessory symptom, is discovered, and even before it became impressed on the imagination.

102. *β*. An undue indulgence in a single train of thought of any kind, particularly when involving any moral emotion, may lead to partial insanity, especially when the individual is physically disordered, or is out of health — when his digestive, assimilating, and excreting functions are deranged, and his nervous energies are weakened; and this is the more likely to occur, if his intellectual and moral powers have been imperfectly or improperly cultivated in early life. In these cases, the insanity is gradually developed, or in a similar manner to that now described: in some it is the consequence of excessive devotion to a particular department of abstruse investigation — of exertion beyond the natural energy of the mind in one particular direction, and to the exclusion of countervailing healthful occupations of the intellectual and moral faculties, and of requisite relaxation of mind; in others, it gradually arises out of the habitual indulgence of some moral emotion or sentiment, or of some more violent passion, intellectual energy becoming impaired, and at length more obviously disordered. In many instances of this kind, as well as of the preceding, the insane delusion is occasioned chiefly by fears, anxieties, expectations, and excitements, of either a religious, a political, or a domestic nature, or even by the terrors produced in weak and susceptible minds by the vehement language and denunciations of popular and other preachers. The following case adduced by Dr. PRICHARD illustrates the connection of the hallucination with previous occupations, and with the moral influences to which his mind was subjected. A young man, whose father was frequently employed in criminal prosecutions, had assiduously attended the sermons of a preacher noted for the vehemence of his exhortations, and had devoted himself, to the neglect of sleep and bodily exercise, to studies, for which he was unprepared. He became depressed in spirits, and disordered both in mind and in body. The morbid feelings which afflicted him at length conjured up an imaginary cause for themselves, that soon became indelibly impressed on his belief. He fancied himself suspected of some horrible crime, for which a process had commenced against him; and, whenever the door of his room was opened, he supposed that officers of justice were coming to apprehend him.

103. It is unnecessary to adduce instances in proof of the position already stated, that the erroneous belief or delusion, constituting partial disorder of the understanding, is generally, or at least frequently, consequent upon, and afterwards associated with, previously existing moral insanity. Whether this connection exists so universally as Dr. PRICHARD believes, I will not assert; but it doubtless may be traced in the great majority of cases. It will further appear from what I have next to adduce, that the illusion is generally some notion as to the powers, property, or destination of the person affected, engrafted upon his habitual state of desire or aversion, passion or sentiment — or an erroneous idea or belief arising out of morbid sensations, which the imagination, influenced by predominant feelings, emotions, passions, or trains of thought, converts into diversified shapes; and that the illusion consequently assumes a character and form, more or less obviously moulded by such feelings and trains of thought.

104. *b*. HYPOCHONDRIACAL MONOMANIA. — *When the fears, apprehensions, and despondency of an individual are concentrated on his bodily feelings, relate to some disorder by which he is affected, and which he exaggerates, and are connected with an erroneous belief, or hallucination*, a state of disorder exists, which may be aptly termed *hypochondriacal monomania, or hypochondriacal disorder of the understanding*. The mental affection here gradually supervenes in the course of the bodily disorder. — The *first stage* of the malady is *hypochondriasis*, and does not, as I have contended (see the article, § 19.), amount to insanity, until the hallucination is manifested. It is true, that it is on the verge of insanity, — that it is closely allied to it, — and that it may be viewed, in its more fully developed states, as a variety of moral insanity; but still, until an erroneous belief is entertained, the mere exaggeration of bodily ailments, and the apprehensions, despondency, and concentration of the attention towards them, do not constitute, especially in the eye of the law, a true form of mental derangement. In the great majority of

instances, the hypochondriacal affection does not pass into, or occasion, an insane delusion; but when this change has taken place, and when a man fancies that his head is too large to enter in at the door, that his legs are made of clay, or that he has a fish or a demon in his stomach, the nature of the disease is different, and in no respect doubtful.

105. A flatulent hypochondriac may ultimately suppose that a living creature or a demon, according as he may be influenced by religious or superstitious ideas, is actually lodged in his abdomen. Dr. JACOBI (*Samml. f. d. Werk. der Gemüthekrankheiten.* Elberj. 1822, p. 21.) mentions the case of a man, quiet and rational on other topics, who entertained the notion that there was a person concealed in his belly, with whom he held conversations. He often perceived the absurdity of this idea, and grieved in acknowledging and reflecting that he was under the influence of it, but yet could never get rid of it. An attempt was made to cure this man by applying a large blister on his abdomen, and, when it was dressed, and the vesicated skin snipped, by throwing from behind him a dressed-up figure, as if just extracted from his body. The patient at first believed in the success of the performance, and was joyful in the full persuasion that he was cured; but some morbid sensation about the bowels, which he had associated with the insane impression, being again experienced, he took up the idea that another person similar to the first was still left within him.

106. *c.* MELANCHOLIC MONOMANIA — *Melancholia* of authors — *Lypémanie* of ESQUIROL — *Tristimania* of RUSH — *Melancholia with delirium* of PINEL — *is characterised by sadness and despondency, the mind being given up to fears and anticipations of evil, to an erroneous belief or impression, concerning one subject, or a particular series of subjects.* — Authors since HIPPOCRATES have applied the term melancholia to delusions characterised by sadness and despondency; and this form of insanity was, according to GALEN, so denominated, because all the sad or desponding moral affections depended upon a depravation of bile, which had become black, and obscured and disordered the animal spirits. CÆLIUS AURELIANUS and most of the ancient writers did not distinguish between melancholia and hypochondriasis; and even the authors of the 15th, 16th, and 17th centuries continued to confound them, although various relations between melancholia and other affections of the mind were distinctly pointed out by them. M. DE HÉRÉDA and FORESTUS first noticed the connection of gloomy ideas and despondency with a partial delirium, or delusion, in this malady; and SENNERT considered that the insane delusion was consequent upon despondency. HOFFMANN and BOERHAAVE marked the relation between melancholia and mania, and the frequent origin of the latter in the former, — thus regarding melancholia as a slighter grade or earlier stage of mania. SAUVAGES defined melancholia to be a partial or exclusive delirium, without furor or excitement, associated with a chronic disease. CULLEN was among the first who took a correct view of this malady, and who carefully distinguished it from hypochondriasis; but it is chiefly to PINEL, ESQUIROL, and GUISLAIN, that we are indebted for accurate ideas as to its nature and relations.

107. *a.* Most writers have been more particular in their descriptions of the fully developed state of melancholia, than in pointing out the origin and rise of the malady, the importance of which is by no means small; and have overlooked the commencement of it in the moral disorder already noticed. M. GUISLAIN and Dr. PRICHARD have, however, remarked the absence of delusion in the more simple and early forms of the complaint. M. GUISLAIN observes, that there are melancholics without delirium or hallucination, as well as maniacs without any remarkable disorder of the intelligence, and these exhibit the most simple form of the distemper. Such persons are sad, depressed, despondent, &c.; but evince no remarkable aberration of the imagination, of the judgment, or of the intelligence. In this stage or state of disorder there exists only a form of moral derangement, which may proceed no further. But when erroneous notions or delusions, or a disposition to entertain an idea of suicide, or attempts to commit it, are manifested; or when any unusual or irrational determination is shown; then the disorder is no longer simple, but is fully developed and established, and actively influences the will.

108. In this state the patient is quite cognisant of what takes place around him; he appreciates more or less his situation, and recognises his friends and enemies; but fear, despair, or despondency, govern him — he is absorbed by the painful sentiment. Overwhelmed by it, prostrated, lying on his bed, or sitting with clasped hands, his head bent forwards, his eyes obliquely fixed on their object, he presents the very image of sadness. His voice is low; his expressions and acts are slow, prudent, and distrustful; he answers only in monosyllables; seeks solitude, and is reserved. His countenance is pale or sallow; his features are altered; his brow more furrowed; and he appears older than he is. He often complains of a sense of weight in his head, and sometimes of a void or of a feeling of emptiness in his cranium, occasionally with uneasy sensations or pains in the scalp. His repose is unsound — his senses only being asleep, while his mind is awake; and he complains of not enjoying an hour of sound repose; but occasionally he is somnolent. He is kept awake by his fears, jealousy, or illusions; and when he dozes, he is terrified by phantoms and frightful dreams. One, after having passed a good night, is more depressed and unquiet. Another believes that he will not get over the day, and yet feels better as the night approaches; and a third has his inquietude increased at night, dreading the solitude, the obscurity, the sleeplessness, the frightful dreams and phantoms attending every attempt to get rest.

109. Some refuse for several days all kinds of nourishment, restrained by illusions or hallucinations which increase their chimerical fears. Some dread poison, dishonour, &c.; and others abstain from food, in order to escape from a wretched existence, or to do penance for a supposed crime. The sensibility of some is acute, and the slightest occurrences produce the most vivid impressions. Heat, cold, rain, wind, light, noise, and all physical agents affect them inordinately. If there be the slightest cause of fear, they are terrified; if there be the least cause of regret, they are in despair; if they suffer the smallest reverse or disappointment, they be-

lieve themselves ruined. Their nervous system is morbidly susceptible, and their moral emotions, especially those of a gloomy kind, are remarkably exaggerated. They are physically and morally susceptible; and yet their sensibility is concentrated upon one object, or train of ideas. So complete is the concentration of their feelings, that they are almost inaccessible to impressions unconnected with the subject of their melancholy; a moral abyss separates them from all objects and sentiments that present no relation to their fears or delusions.

110. Anxieties and fears respecting any matter, and all the depressing passions, particularly when long indulged, or frequently reiterated, sway the intellect and judgment, and originate thoughts the most opposed to the dictates of common sense. These may ultimately pass into false perceptions and hallucinations, which will further increase the unjust inferences, the morbid belief, the unfounded fears, and the terrors already entertained. Fear, in all its forms, whether proceeding from a real or an imagined cause, exercises a dominant influence on the melancholic. A person whose fears have been excited by denunciations against religion, becomes, under the influence of these fears, anxious and depressed; his sentiments and power of attention are concentrated upon the object of his insanity; his fears exaggerate their causes, as well as the consequences which these causes may produce; and at length delusions are generated and entertained, influencing not only his thoughts, but also his actions. The victim of fanaticism or superstition may thus ultimately believe himself to be pursued by the vengeance of Heaven; or he may become the prey of anxieties, as to his state, so intolerable as to lead him to prefer death to incertitude. He who has offended the laws, continually apprehends the officers of justice; and, at last, believes himself in their power. Another, who has long dreaded the wickedness of man, ultimately believes that some one threatens his fortune, his honour, or his life; the least noise, sign, or doubtful word, exciting and confirming his fears or his belief. Some are afraid of every thing, and are subject to perpetual anxiety, or are terrified by a vague sentiment, without motive or object. Their expressions, attitudes, actions, and discourse, express extreme fear, which they cannot overcome, and which they cannot explain, or account for.

111. The delusion of the melancholic derives its character from the moral affection which preoccupied the mind on the appearance of the malady. A merchant has experienced losses of little moment, and he believes himself ruined, notwithstanding demonstration to the contrary; two brothers have had a dispute, and one becomes persuaded that the other has an intention to murder him, to obtain his property. Frequently, some one of the moral sentiments of the melancholic is so remarkably exaggerated, as to predominate over every other consideration, and to give rise to acts of despair. Many of the murders committed during this malady are the result of this morbid state of feeling. A mother abandoned by her husband attempts to destroy her children, to prevent a similar misfortune; and a religious enthusiast kills his infants, to send them to heaven before their minds are corrupted.

112. Some melancholic persons are conscious of the absurdity and the falsity of the fears by which they are tormented. They reason respecting them, and even are distressed at being the victims of their apprehensions; but still they continue a prey to them, and they find it impossible to think or act otherwise than under this dominion. An insurmountable power governs their reason, and they believe that the Almighty, or some demon, or fate, or some other power, influences them. The will of the hypochondriac is inflexible. No consideration or sentiment can overcome his alarms and errors, or his aversions.

113. *β*. The *physical symptoms* of melancholia vary much in different persons, and even in the same person in different periods of the disease. The patient sometimes has a sense of constriction in the chest, and places his hand over the heart, complaining of anxiety and oppression, or of pain in that organ. The pulse is more frequently slow, than natural or accelerated. The tongue is often loaded, the appetite is impaired, the bowels costive, and the whole series of digestive functions more or less deranged. The urine is often pale and abundant.

114. *γ*. The *Diagnosis* of melancholia from hypochondriasis becomes a matter of some importance, seeing that they have been confounded by the older writers, and that the one may be mistaken for the other. Melancholia is more commonly hereditary than hypochondriasis, depending upon the melancholic temperament, which predisposes to the operation of the exciting causes, especially errors in education, and other influences acting directly on the brain, the sensibility, and the understanding. The causes which produce it are more generally moral; whilst hypochondriasis more commonly proceeds from causes which are physical, and which modify the functions of the stomach and other digestive organs. In melancholia there is a fixed delusion or insane idea, which is entertained with sadness and despondency, and a vicious association of ideas. In hypochondriasis, on the contrary, there is no insane delusion, until the disease passes into melancholia; but the patient exaggerates his sufferings — his mind is continually occupied with his ailments, which he believes to threaten his life — and he is continually subject to dyspepsia and other disorders of the digestive functions. — See article HYPOCHONDRIASIS (§ 19.).

115. *δ*. The *Causes* of this species of insanity are — the melancholic temperament, hereditary conformation or constitution, moral susceptibility, and increased sensibility; sudden shocks, reverses, disappointments, anxiety of mind, and all the depressing sentiments; frights, terror, fear; losses of fortune or of friends and connections; political reverses, and changes, and revolutions; fanaticism, superstition, and unsound views of religion; wounded self-love, humiliating circumstances or occurrences; masturbation, and whatever causes physical and moral exhaustion; and injuries of the head.— The *pathological* causes are chiefly — the suppression of accustomed discharges, protracted indigestion; and hypochondriasis, diseases of the heart, and of the digestive organs, obstructions of the liver and mesenteric glands, diseases of the uterus, &c. Most of these, however, are rather coincident disorders, than influential agents in the production of the mental affection.

116. M. ESQUIROL states, that of 482 cases of melancholia, the chief causes were—hereditary pre-

disposition, in 110; domestic unhappiness, in 60; reverses of fortune and distress, in 48; disappointed affection, in 42; the critical period of life, in 40; the puerperal state, in 35; venereal excesses, in 30; suppressed menstruation, in 25; intemperance in wine, in 19; frights, in 19; anger, in 18; wounded self-love, in 12; injuries of the head, in 10; jealousy, in 8; and masturbation, in 6. It is obvious, however, that this is only an approximation to accuracy, as, in many cases, several causes have concurred in producing the disease.

117. ε. The *course* of melancholia is usually continued, but is sometimes remittent, or even intermittent, or recurrent. It has even been observed to have been periodic. — Its *duration* is most variable. When it terminates in health, the change generally takes place between the third and the thirteenth months, — six months being about the average duration of these cases. Although there is so little moral reaction in this species of insanity, yet it is amongst those from which recovery most frequently takes place. A favourable change has been observed to follow the occurrence of a natural evacuation, especially when that has been suppressed, as the menstrual and hæmorrhoidal discharges, &c. It has also disappeared after the breaking out of boils and cutaneous diseases. The occurrence of hæmoptysis, of tubercular consumption, and of asthma, has sometimes been observed to dissipate an attack of melancholia; but the patient has died of the consecutive malady.

118. On the other hand, various organic lesions often appear in the course of melancholia, and are to be viewed rather as being favoured by it, than as accidental occurrences. Certain of them, indeed, have been considered as concerned in the production of the mental disorder; but it is much more probable, that the physical and moral changes are the results of the state of organic nervous influence, although the physical may augment the moral, and *vice versâ*, — the one acting and reacting on the other.

119. ζ. The *visceral diseases* most commonly observed in the course of melancholia, or in fatal cases of it, are tubercular and other organic lesions of the lungs, chronic pleuritis, enlargements and engorgements of the liver, alterations of the heart and spleen, and various displacements of the colon, particularly the descent of the transverse arch. This last change was first insisted on by M. Esquirol; and has been observed in melancholia by Bergman, Wichmann, Hesselbach, Guislain, Müller, Annesley, and myself. The transverse arch is sometimes displaced obliquely, so that its left flexure is carried downwards behind the pubis, and it occasionally descends perpendicularly, in a loop or duplicature, as far as the pelvic cavity. Displacements of this viscus are observed also in other forms of insanity, but not so frequently as in melancholia. M. Esquirol considers that organic lesions of the brain are not frequent in this species of the disease; the number of cases in which changes were observed by him in this part being much smaller than observed by M. Foville and others, who have more justly appreciated the minute alterations which take place in it during mental disorders. M. Esquirol confirms the remark of Lorry and Mead, that tubercular phthisis is the most frequent cause of death in melancholia, and subjoins the following enumeration of the organic lesions found in 168 cases: — *Within the cranium* — thickening of the membranes, 2; organic alterations of the substance of the brain, 4; ossific deposits in the falx, 3; effusions of blood in the brain, 5. *In the chest* — organic lesions of the lungs, 65; disease of the heart, 11; effusion into the thoracic cavities, 6. *In the abdomen* — displacement of the colon, 33; adhesions and suppurations of the peritoneum, 5; ulceration in the stomach or pylorus, 6; ulceration in the intestines and rectum, 7; intestinal worms, 5; tænia, 1; organic lesion of the liver, 2; biliary concretions, 7; ulceration in the uterus, 6.

120. η. Melancholic monomania may *pass into*, or become *associated with*, some one of the other varieties of insanity, or even with more than one of them. It occasionally passes into mania, and even degenerates into dementia. In this state the patient retains the predominant ideas; but these are incoherent, without order, and do not harmonise with the actions; whilst previously the ideas were strong and fixed, and the determinations of the will were the immediate results of the characteristic delusion and trains of thought.

121. *b*. Demonomania. — The Chaldeans, the Phœnicians, the Jews, and the Greeks believed that most diseases, particularly those of the brain and mind, proceeded from demons or evil spirits. Job was said to have been the victim of a demon; and Saul to have been under the influence of an evil spirit. Aristophanes termed the highest grade of madness, not *μανία*, but *κακοδαιμονία*. Herodotus was, however, nearer the truth, when he said that Cleomenes had become mad from intoxication among the Scythians, and not by the presence of a demon. M. Esquirol has, conformably with the original acceptation of the word, comprised the two varieties of partial insanity about to be noticed, under the appellation of *Demonomania*. The first of these varieties, or *Theomania*, is still of frequent occurrence; the second, or *Cacodemonia*, was common in ancient times and during the prevalence of popish superstition; and, indeed, still frequently occurs in countries where superstition lingers.

122. α. The *Theomaniac* is characterised by an enthusiastic belief in divine selection and acceptance, and in the future eternal damnation of all who do not think, as to religious matters, exactly as he does; by a belief of having received revelations from the Almighty, or of being inspired, or of holding communications with the Holy Spirit, or with angels or saints; or by a belief of having received a mission from Heaven to convert sinful men. Persons who have had their minds inordinately excited by preachers who are themselves thus affected, or who are noted for the vehemence of their language, and by the enthusiasm of their belief in the more alarming or exciting topics of religion; or those whose thoughts have been long or painfully directed, especially during nervous exhaustion and susceptibility, to these topics, and to the punishments of a future state, and have become impressed by exaggerated ideas of their own wickedness; not infrequently become melancholic, and after a time theomaniac. But, whilst this latter state of mental disorder may thus appear consecutively in some, it may occur primarily, from the same moral causes, in others. In the former cases, it is a state of morbid mental reac-

tion consequent upon the previous depression, and belief of condemnation; in the latter, it is a state of primary mental excitement, connected with more or less delusion. The instances of religious excitement furnished by the "revivals," the camp meetings, and field preachings in America and Scotland, the modern "gift of tongues" in this metropolis, are all forms of this kind of partial insanity; which, however, is sometimes of temporary continuance only, especially in hysterical and excitable females; but which often passes into more furious mania, or confirmed insanity. The frequency of this form of mental disorder in females, and other circumstances belonging to its history in this sex, show its occasional connection with hysteria; and that at least the hysterical state favours its occurrence.

123. *β. Cacodemonia.*—NEWTON remarks, that when men abandoned the worship of the true GOD, the stars became the first objects of their idolatry, as most striking to the senses; and were supposed to exercise a continued and active influence on the mind. Melancholy was then thought to depend upon the course of the planets; and the frequent periodicity of the disorder confirmed the belief. Hence the word μηνη, luna, furnished the appellations mania, lunaticus, lunacy, for this and other mental disorders. The doctrine of spirits taught by SOCRATES, PLATO, and even by still more ancient philosophers, having become associated with Christianity, the influence of these spirits upon the human body became an article of general belief, and was implicitly received, until the Reformation, and the mental freedom to which it led, dispelled the mists of superstition. The dread of yielding to the instigations of the devil, and of being in the power of demons, led to the institution of exorcisms, and to ceremonies in the more primitive church, to deliver those who were believed to be thus possessed. These ceremonies tended to cherish the idea as to the influence of evil spirits; and was, indeed, with various concomitant circumstances, the chief cause of the continued belief in this source of mental disorder. With the extension of popish superstition, the numbers of demonomaniacs increased; and, in many of the larger cities of Europe, stated feasts and ceremonies were established for their cure. The pomp and solemnity observed on these occasions, and the crowds assembled, struck the imaginations of those affected, and contributed to the cure of a few of them. In these times, demonomania assumed a variety of forms,—and the most common and the most recent were those of sorcery and witchcraft. As long as both church and state prosecuted and cruelly punished those objects of self-delusion and of popular belief, the community were firmly persuaded of the reality of demonomaniacal possession; but as soon as governments ceased to punish these extravagancies, the chimerical fears which affected the populace, and by which the minds of the weak, of the melancholic, or of the hysterical were tortured, gradually subsided, and ceased to produce their wonted effects, and cases of this form of derangement were rarely observed. The progress, also, of education and of knowledge dissipated these errors, which led to, and nurtured, a belief in the influence of demons; yet still, in popish countries, some monomaniacs believe themselves in the power of demons, and furnish instances which may serve to illustrate, or to explain, the psychological extravagancies which disgraced governments and religion for so many centuries. The delusions arising out of ignorance, improper education, and superstition, gave rise, in those days, not only to the most humiliating errors of the understanding, but also to the most cruel exhibitions and actions of which human nature was capable. The history of mental delusions arising out of the superstitions, the wild doctrines, and the fanatical extravagancies which disgraced Europe for so many ages, furnishes innumerable proofs, not merely of the narrow limits of the human understanding in those times, but also of the degraded state of the passions and moral sentiments. How frequent and how horrible were the instances which then daily occurred, not only of the delusions of ignorance and superstition, but likewise of the lowest depravation of moral feeling! A reign of superstitious terror continued to exert its baneful influence on the human mind, blighting the intellectual powers, and withering the most generous and ennobling of the moral emotions.

124. In the present day, although the instances of monomania arising from a belief in the power of demons, or evil spirits, are rare, those which proceed from other causes of terror — especially from the fears of future damnation, as inculcated by fanatics and enthusiasts, and from the dread of imprisonment or of civil punishment—are as numerous as ever, — each case presenting characters derived from the principal cause of disorder. In modern times, M. ESQUIROL remarks,—and especially during the civil commotions in France, in the end of the last, and commencement of the present, centuries, — monomaniacs express as much dread of the tribunals of justice, as they formerly entertained of the influence of demons and of evil spirits. It is always fear, dread, and anxiety, which affect these unfortunate creatures, and cause the disorder which possesses them.

125. *c.* MISANTHROPIC MONOMANIA is sometimes met with, particularly in persons of a melancholic temperament, who have become hypochondriacal, or who have experienced disappointments in their affections and friendships, or who have been unfortunate in their attachments and well-founded hopes. In these persons, and even in others where the origin of the affection is less manifest, dejection of spirits is associated with malevolent feelings; and the resulting effects are, a distrust of every one, and a belief in machinations and persecutions intended for their ruin. They are in a state of continued misery; they believe themselves objects of universal hatred and detestation. They not only conceive plots of all kinds being formed against them, but also consider their dearest friends to be their most implacable enemies. They suspect poison in their food or drink; and their imaginations convert every act or every expression into designs to injure or to insult them.

126. *f. Excess of self-love* is an ingredient in every modification of monomania; but when exaggerated ideas connected with personal advantages or mental accomplishments are entertained, — when self-love, in the more common forms of vanity or of pride, is inordinately indulged,— either the mind becomes disordered from the repeated or continued contemplation, or the mental disorder is coloured by this circumstance when produced by other causes. Dr. PRICHARD observes, that ex-

cessive self-love, combined with an elated and sanguine disposition, instead of depressed spirits and a morose temper, produces cheerful illusions, which always maintain their relation to the person of the lunatic. A monomaniac fancies himself a king, the pope, a favourite of Heaven. This, however, does not constitute a single delusion, leaving the mind perfectly sane upon other points; for the same individual generally magnifies himself in other respects. Nor does the gay and cheerful state of monomania always result from this association of excessive self-love with the sanguine disposition, as supposed by Dr. Prichard; but rather from a vitious education, and from the excessive indulgence of the emotions of vanity and pride, especially in early life, in connection with various concurrent causes acting upon the nervous system of susceptible, weak, and nervous persons.

127. *g.* The preceding comprises all necessary to be stated in order to recognise the more simple states of partial disorder of the understanding. But, as these states are often consequent upon moral disorder, and occasionally are associated with it from the commencement, the physician should be prepared to meet with, in practice, numerous instances of *the association or complication of these forms of derangement.* To describe the almost innumerable modes in which each of the several forms of moral insanity may be complicated or associated with either of the varieties of partial disorder of the understanding, would be endless; and even to adduce instances illustrative of some of the more striking states of this complication, would be far beyond my limits, and be attended by few advantages. The works of Guislain, Heinroth, Prichard, and Esquirol furnish sufficient examples of this association; and to these I refer the reader. Besides, no one can possibly mistake cases of this description, when they come before him in practice, nor misapply the means, moral or medical, which they require for their treatment.

128. ii. General Insanity.—In general insanity, not only are the *moral emotions* and the *intellectual faculties* weakened or deranged, but all the *instinctive desires* and *feelings* (see note, § 66.) are also disordered. The ideas are in a state of confusion, and perpetual and general disturbance, and none of the powers or manifestations of mind can be exercised even for the shortest period. General insanity presents three principal species, usually denominated *Mania,* or raving madness; *Dementia,* or incoherent insanity and mental imbecility; and *Fatuity,* or annihilation of the mental faculties. To each of these I proceed to direct attention.

129. *A.* Mania, or *Madness*—*Hyperphrénie,* of Guislain—*Raving Madness*—*is characterised by a disordered association of ideas, which are reproduced without connection and with extreme rapidity, by remarkable derangement of the understanding or judgment, by alienation of the affections, by the violence of the will or volition, and frequently by false sensations, illusions, or hallucinations.*—It is either a chronic disease, or liable to lapse from an acute into the chronic state; is commonly unattended by general fever, although the pulse is usually more or less accelerated, especially at an early stage; and it chiefly consists of *perturbation* and *exaltation of the sensibility;* of *disturbance of the instinctive, the intellectual,* and *the moral manifestations of mind;* and of *excitement of volition.*

130. *a.* The *acute form of mania* presents itself in different grades of intensity; the *mildest* of which has been denominated by Guislain, *Tranquil Mania,* and may be named *sub-acute mania;* the most violent, as described by Chiaruggi and others, may be called *hyper-acute mania.* Either state, however, may pass into the other; and both may commence more or less suddenly, and reach their acme with great rapidity. Generally, however, *premonitory symptoms,* manifestly indicating very serious vascular disorder in the brain, have existed for some time before the mind becomes evidently deranged. In the case of an eminent writer on medicine, who died some years since, marked indications of vascular excitement in the brain were evident to me more than a twelvemonth before mania burst forth. Almost always for some days, often for some weeks, and even for months, before the disease is established, occasional fits of excitement and perturbation, disturbing for a time the judgment, are experienced. The patient is, during this time, or at various periods, in a state of agitation, of feverishness, and of uneasiness. He is restless; morbidly active; his imagination is lively; he is full of projects, often trifling or absurd; and he enters upon pursuits with energy, but relinquishes them quickly and without sufficient reason. His head is generally hot, his feet cold; his sleep is short, broken, and disturbed; and he either lies awake, ruminating on various speculations; or gets up, paces the room, or attempts to occupy himself, but each successive attempt is soon relinquished, in a state of perturbation, or of quiet distraction. During this period, some experience fits of painful terror, or of agitation, and not only pass sleepless nights, but by day are in a constant state of uneasiness and restlessness, or of action leading to the performance of little or nothing. Others are disquiet and depressed, and are impressed by a feeling of an impending calamity, or by a dread of losing their reason. In some, the appetite is voracious; but the stomach is readily disordered, and intemperance is followed by severe affection of this organ. In others, the appetite is deficient or capricious. The bowels are often torpid. At this period, a desire of intoxicating liquors, and intemperance in the use of them, are manifested suddenly, although previously disliked.

131. At length reason is overturned. The individual scarcely knows what he says; repeats his words often, or talks nonsense, or is unable to complete his sentences, or suddenly breaks off in the middle of them. He utters confused expressions, in a rapid or impetuous manner; or he makes ineffectual efforts to collect and to express his thoughts. He appears to those about him in a state resembling intoxication. He laughs, cries, is irritable, is prone to anger on the least opposition, and is most obstinate, self-willed, and capricious. This morbid state of mind may continue for some time,—particularly when humoured by friends,—without exciting much alarm, or leading them to adopt measures of restraint. At length, on some attempt being made to interfere with, or to oppose, his absurd pursuits, he breaks out into the wildest violence, and even attempts acts destructive of, or injurious to, others or himself, and requiring the most strict coercion.

132. This state may exist without any false perception, or delusion. Very frequently, however, as soon as violence is manifested, some illusion or hallucination, or absurd impression as to his own person or powers, or his relation to others, appears; but it is seldom permanent, as in monomania; it is soon forgotten, or gives way to some other phantom.

133. *α*. In the *milder*, or *sub-acute cases*, the disease may proceed without much violence, unless the patient be greatly excited; but his emotions are capricious, warm, and enthusiastic, and his ideas are confused, inconsistent, or unconnected. He seems half drunk, and like one who endeavours to collect his thoughts and to express them connectedly, but fails in the attempt. His temper is irritable; he is self-willed; his habits, feelings, and affections are changed; he is incapable of any exertion, of attention, or of thought; is in a constant state of uneasiness and of restless action, without being capable of performing any thing; and is altered in countenance, expression, and general appearance.

134. *β*. In *severer*, or *more acute cases*, or as the disease increases in violence, all the phenomena are more developed. The malady may proceed for many days, or even weeks, before it reaches its highest pitch. During this period, the derangement varies somewhat according to the predominance of particular feelings or passions. Sometimes the patient is terrified and agitated; frequently he breaks out into the most violent expressions of rage and enmity against his relations or friends, or whoever may have been obliged to exert control over him, or restrain his mad proceedings, uttering bitter execrations, or threatening vengeance and condign punishment. His nearest and dearest relatives are now the objects of his most vehement displeasure. As the malady approaches its acme, his ideas become more and more disordered and unconnected. His thoughts and feelings are expressed with exclamations and ejaculations, with the utmost agitation of countenance and manner, and with the most violent and irregular gesticulation and action. He is so absorbed by his internal sensations and emotions, as to be almost unconscious of external objects and impressions. He seems deprived of all affection, of all ideas of right and wrong, of every feeling of shame, of every principle of probity and honour, and of all parental or filial affection. The advice, conversation, or even the presence, of near relatives, irritates or exasperates him. He utters the most blasphemous, the most filthy and indecent, language; and the most injurious, calumnious, scandalous, and unjust expressions, respecting his dearest friends. Many maniacs are disregardful of cleanliness and personal decency, and are most disgusting in their expressions and habits. They seem as if excited by an internal heat, enabling them to bear, often with complete impunity, the continued impression of great cold; and they sometimes even complain of it either in the head, or in the abdomen, or circulating in their veins. Hence their desire to go almost without clothes, or to expose their persons. They are occasionally deprived of sleep for many days, or even weeks, together. They generally become more or less emaciated, and the features haggard, wild, or maniacal. Their eyes are watery, suffused, red, prominent, brilliant, and fixed or vacant. Their motions are quick and threatening; and the expression of their countenances so changed, as often not to be recognised by their friends. All the functions are now disordered. The bowels are obstinately costive, especially early in the disease; but afterwards they are often irregular. The appetite is frequently lost for many days; but it is sometimes voracious. The tongue is furred or loaded; the skin cold and clammy, excepting on the head; and a frothy saliva, mixed with mucus, is often excreted.

135. *γ*. The *most acute states of mania* have been graphically described by Pinel and Chiaruggi. At the commencement of such cases, the patient is impetuous, audacious, menacing in his aspect, and shameless in his habits; his forehead is contracted; his eyebrows are drawn up; his hair bristled, and his breathing hurried. His evacuations are deficient; and his skin becomes dirty and sallow. His countenance begins to glow; his eyes become fiery and sparkling; his looks unfixed; his eyelids drawn widely open and closely shut by turns; his eyeballs prominent or protruding and injected; he is insensible of cold and hunger; and his sleep is lost, or it is very short and unquiet. As the disease proceeds, his loss of reason, violence, and anger are remarkably increased; he shrieks, roars, rages, abuses his dearest friends; destroys or breaks whatever comes in his way; tears his clothes to pieces; and is often disposed to go quite naked, or with his person exposed. Whoever touches him, is abused or struck by him. His ideas are strangely confused, and his mind is occupied by absurd prejudices or delusions. After a period of violence, stillness takes place for a short time; and when alone, he talks, gesticulates, and exclaims, as if he were wrangling with persons about him. When restrained, or confined, his countenance assumes a satanical or ferocious expression: he throws away, with imprecations and shrieks, the food presented to him, but is compelled by thirst to swallow fluids. After some days, hunger begins to be felt; and often the most disgusting things are taken greedily. Even the excrements, in some instances, are devoured; and the evacuations, which are usually dark and offensive, are smeared over the clothes, beds, or walls. Notwithstanding the patient's constant exertion, and prolonged want of sleep, his muscular strength seems to increase; his limbs acquire remarkable pliability and nimbleness, and the greatest feats of strength and agility are performed without exhaustion. However bold and menacing he may be, a strong threatening voice, a piercing and commanding look, and even the sight of the means of secure restraint, readily daunt him. After his violence has expended itself, he becomes still, or gloomy, and appears as if brooding over something; but he breaks out, often unexpectedly, into a new storm of rage and violence. At length a real cessation of violent paroxysms ensues: exhaustion, with unquiet sleep, disturbed by fearful dreams, takes place. The pulse becomes small, the general aspect squalid and meagre, and the countenance pallid and haggard. The patient is now obstinately silent, or sings and laughs in a strange manner, or chatters with incessant volubility; and at times seems as if lapsing into a state of fatuity; but these uncertain intervals are frequently interrupted by short fits of violence. Memory, how-

ever, continues without much impairment during the course of the disease, and the senses possess an unusual degree of acuteness and susceptibility.

136. Acute attacks of mania generally attain their highest intensity, or begin to decline, in about a month from their commencement. In many, however, intervals, or remissions merely, of the violent symptoms occur, about or soon after this time; and from such remissions may be dated the accession of the advanced or chronic stage of mania. When patients do not recover after a succession of attacks, either the powers of mind are exhausted to so low a grade, that the disease lapses into permanent fatuity, or the mental exhaustion continues as a period of calmness, after which an attack of violent madness recurs; or it passes into a state of melancholy, or of mental incoherency. As the maniacal attack becomes chronic and confirmed, so frequently does it assume either of these forms; but, in the more prolonged cases, sense and understanding are more and more completely abolished. During the more acute states of the disease, patients are rarely affected by any epidemic or contagious malady; and, according to several authors, dropsies, consumption, and various other chronic diseases have disappeared on the accession of violent madness. In many cases, however, the disappearance of these has been illusive, the maniacal affection merely *masking* the pectoral or other disease, which may have been in some degree interrupted in its course, but rarely removed, or even materially benefited.

137. *b. Chronic* or *protracted mania* is generally consequent upon either of the forms of *acute mania;* but it may follow any of the varieties of *partial insanity*, already described; or it may appear as the *primary affection*. This last, however, is the least frequent mode of its accession. It is, in many instances, merely a stage of transition between acute mania and dementia or incoherency, but a very protracted one in most cases, and of very uncertain duration. It often lasts for many years, and sometimes for the greatest part of life, and is the state of alienation presented by the great majority of the inmates of asylums. *Chronic mania* is characterised by marked impairment of the powers of attention, memory, comparison, combination, and, consequently, of judgment; and is a state of intellectual weakness, in which none of the operations of mind is performed with effect, often associated with some false perception or delusion. The individual is quite incapable of continued conversation, and of the duties of society: his conduct and actions are without consistency, steadiness, or rational object; and his thoughts are wandering and incoherent, He presents a state intermediate between either monomania or mania, and dementia or incoherency — a mental condition, combining many of the phenomena of these disorders. It is to this class of cases — to this form of mania — that the term lunacy is, perhaps, most applicable. Dr. PRICHARD remarks that many continue long to display the characters of mania; but, except during particular periods of renewed violence or agitation, to which most are subject, they become more tranquil than at the commencement of this complaint. They show signs of incipient dementia combined with morbid activity of body, in which the excitement characteristic of their disease exhausts itself in almost perpetual action. Lunatics of a different class fall into a state of calm reverie; their imagination, abandoned to itself, without the control of judgment, gives itself up to wanderings without end. Even in attempting to converse, or when their attention is excited by questions, they exhibit a strange mixture of reason and mistakes, both as to facts and inferences. Others — and these are the most numerous — are governed by some particular passion, mental habit, or delusion; the illusion having reference to their own persons, or to their relations to other individuals.

138. The illusions in this form of disorder are not, like those in monomania, cherished in the mind, and brooded over in silence, in solitude, or in gloomy reserve: they are more connected with the present objects of sense, and are for ever changing with the casual alterations of feeling or temper. In a great number of those who are threatened with general paralysis, or who are already attacked by it, M. CALMEIL has shown a peculiar form of delusion to exist. The patient is in a state of exaltation or of joyous delirium, fancying himself the owner of millions, of towns, empires, &c. He is intoxicated by the flattering belief, and joy manifests itself in his features and gestures. Illusions of this kind often precede the accession of paralysis for several months, and continue for some time afterwards; but they are gradually obliterated with the last traces of intelligence, as dementia becomes developed. In other instances, the joyous delusion assumes a form of maniacal delirium, with excessive agitation and anger; and continues with short intervals of quietude until death ensues, or until it terminates in dementia. In a great many protracted cases, the principal phenomena are referrible to some particular habit or active propensity, and are unconnected with any hallucination or false perception. Indeed, every variety of human pursuit occasionally becomes the subject, in relation to which especially chronic madness is exhibited; and the disorder is displayed, in many instances, rather in the mode of action and conduct, and in the general weakness, or abolition of certain powers of the mind, than in any hallucination or illusion.

139. *c.* The *course* of mania is *continued*, *remittent*, and *intermittent*. The *remissions* may be more or less distinct and regular. They often take place every second day. Whilst there are many maniacs who scarcely ever sleep, there are some who sleep tolerably well. The former are often more quiet during the day than in the night. Others, again, are quieter and more impressible in the morning and in the evening. *Intermittent* mania is sometimes regular, and sometimes irregular, in its accessions. According to ESQUIROL, it constitutes about one third of the number of maniacal cases. It may assume either the quotidian, the tertian, or the quartan type. Or the attacks may recur every eight days, or every month or three months, or six months, or even after longer intervals. They are frequently induced by moral or physical causes, of a manifest kind, as contrarieties, and disorders of the stomach or bowels. Females often experience an accession of mania about each menstrual period, or after each lying-in, or when they suckle, or after weaning. In some it returns every spring, or every summer. Intermissions are more frequent in mania, than in any other form of insanity.

140. *d.* Mania is sometimes *complicated* with

cutaneous diseases, very commonly with hysterical symptoms in females, and often with hypochondriasis in men. It is frequently associated with epilepsy, and still oftener with paralysis, and with other forms of insanity; this last circumstance is the chief cause of doubt and difficulty in the classification of mental disorders.

141. *e.* The *Duration* of the malady varies from two or three days to many months or years. In its more prolonged forms it generally consists in a number of accessions and remissions. It may alternate with phthisis, hypochondriasis, and melancholia; but the pulmonary disease is only suspended during the maniacal attack. It may *terminate*, also, in either of these; but most frequently in dementia, paralysis, or fatuity, or in either dementia or fatuity conjoined with palsy.

142. *f.* The *Diagnosis* is apparent from the description I have given of mania. The more or less general disorder of the mental powers, and the turbulence, violence, and agitation attending it, sufficiently distinguish it from melancholia, and other forms of partial insanity. In the latter, a few only of the affections, the passions, and the desires, or of the sensations, perceptions, or ideas, are deranged. In mania, all the powers concerned in forming the understanding, and in distinguishing between right and wrong, are overturned; and the ideas, feelings, passions, and impulses arising in the mind violently influence the will, they being no longer controlled by the powers of the understanding, nor guided by notions of propriety. The violence, perturbation, and rapid transition of passion, of impulse, and of action, are consequences of disordered excitement, expressed more or less generally upon the moral emotions, and of deprivation of the instinctive feelings and of the intellectual powers, as well those of consciousness as of intellection and reflection. The moral emotions or affections of mind being morbidly excited and uncontrolled by the restraining and guiding influence of feeling and intellect — of affection and judgment — the disordered impulses of the will, and the disposition to commit absurd acts, become strong and violent, especially when opposed, unless the opposition be manifestly above removal.

143. *g.* The *Prognosis* is more favourable in this form of insanity, than in any other, although the most violent and alarming in its symptoms. — *a.* A *favourable result* is often attended by some critical evacuation or change, and especially by discharges from the stomach or bowels; by bilious evacuations; by epistaxis, hæmorrhoids, menorrhagia, leucorrhœa; by ptyalism; by cutaneous eruptions, particularly boils, carbuncles, and erysipelas. As long as mania is simple, it is cured more frequently than any other mental disorder; and especially if there be no very apparent or strong predisposition to it. A first attack generally admits of cure, if it be not complicated with palsy or epilepsy. A second seizure is also often removed, if it remain uncomplicated. But recovery becomes very much more doubtful after the third attack. M. Esquirol states, that of 269 cases of mania that recovered, 132 were from first attacks, 77 from second, 32 from third, 18 from fourth, and 10 from a greater number of seizures. The duration of the disease, in cases of recovery, is much shorter than in other forms of insanity, recovery generally taking place within the first year. Of the above 269 cases, 27 recovered in the first month, 32 in the second, 18 in the third, 30 in the fourth, 24 in the fifth, 20 in the sixth, 20 in the seventh, 19 in the eighth, 12 in the ninth, 13 in the tenth, 23 in the eleventh and twelfth, 18 in the second year, and 13 after the second year. The greater number of recoveries took place in autumn and summer.

144. *β.* An *unfavourable issue* is to be anticipated, if mania has continued longer than two years, and if it be complicated with palsy, epilepsy, or any organic disease. It is certainly fatal in any of these complications, chiefly from the nature of the malady associated with it. Instances are very rare of simple mania terminating fatally. The most frequent maladies causing death in mania are typhoid, or adynamic fever with cerebral affection, general paralysis, pulmonary consumption, epileptic convulsions, and exhaustion of nervous power. M. Esquirol asserts, that no appreciable organic lesion is found in the brains of those who have been subjects of recent uncomplicated mania. But in this, as will be shown hereafter, he is opposed by MM. Foville, Calmeil, Bayle, Guislain, Haslam, Prichard, and others.

145. *h.* The *Causes* which produce mania more especially may be briefly enumerated. — *a.* The acute states of the disease take place most frequently in spring and summer, and chronic cases are often exasperated in those seasons, and in high ranges of temperature. The disease more frequently commences some time between the fifteenth and forty-fifth year, than at any other epoch of life; and it is only in robust persons that it appears later than the fifty-fifth or sixtieth year. When it occurs at an advanced period of life, it is very apt to pass quickly into dementia, or to become complicated with paralysis. It also is more common in males than females, and assumes a more acute or violent form in the former than in the latter. Sanguine, nervous, and irritable temperaments, plethoric and robust constitutions, and susceptible and ardent dispositions, are most predisposed to this species of insanity. Employments and professions have a less marked influence in causing it: yet it appears to be somewhat more frequent in merchants, speculators, military men, and artists, than in persons otherwise occupied.

146. *β.* The individual occasional causes of mania are numerous, and very rarely act singly, but generally in various combinations, in producing their effects. In many cases, there is not merely a concurrence of causes, but also a certain sequence in their operation, necessary to produce the disease. A fright occasions suppression of the catamenia, and this is followed by mania, which subsides upon the return of the uterine discharge.—*Moral* causes are more influential than physical causes. Disappointed affection, frights, jealousy, and domestic misery, affect women chiefly; whilst mental exertion, reverses of fortune, and wounded self-love, principally affect men.—Of *physical* causes, hereditary conformation is by far the most common, and it is almost equally so in both sexes. The next in frequency are parturition, suppression of the catamenia, and abuse of spirituous liquors. The following enumeration is according to the influence they exert, as estimated by M. Esquirol. *Moral causes.* — Domestic unhappiness, disappointed love, fright, reverses of fortune, want, humiliated or injured self-love, excessive mental

exertion, jealousy, and passion. *Physical causes.* — Hereditary disposition, parturition, disordered menstruation, the abuse of intoxicating liquors, venereal excesses, masturbation, the critical periods of life, injuries of the head, insolation, fevers, the suppression and disappearance of cutaneous eruptions and of accustomed discharges, the abuse of mercury, apoplexy, epilepsy, &c., hypochondriasis, and melancholia, have been also enumerated as causes, but they are, when observed, the early or premonitory stage of the malady. (See *General View of the Causes of* INSANITY.)

147. *B.* DEMENTIA — *Incoherency—Imbecility —Amentia,* SAUVAGES—*Incoherent Insanity,* PRICHARD—*Démence,* PINEL — *is a chronic form of insanity, characterised by impairment of the sensibility and of the will, by incoherence of the ideas, and by the loss of the powers of consciousness and of the understanding.*—A person thus mentally deranged is no longer able to perceive and apprehend matters correctly, to seize their relations, to compare them, or even to attend to them. He cannot comprise, in his mind, an exact idea, or even a tolerable notion, of any one subject or object; but is occupied unceasingly with unconnected, incoherent thoughts, and with emotions arising spontaneously, without association or aim. PINEL defines this state of mental disorder to be an incoherency of ideas, which have no relation to external objects; a turbulent and incoercible mobility; a rapid and instantaneous succession of ideas which seem to be developed in the mind, without any impression having been made upon the senses; a continual and ridiculous flux and reflux of chimerical ideas and notions, which destroy each other almost as soon as produced, without intermission and without connection; a similar incoherent but calm concurrence of the moral emotions, of the sentiments of joy, sadness, or anger, which arise and disappear spontaneously, without leaving any trace, and without evincing any correspondence with external impressions.

148. *a.* An imbecile or demented person is deprived of the power of adequately perceiving objects or circumstances, of seeing their relations, of comparing them, of preserving a complete recollection of them; whence results the impossibility of reasoning or reflecting on them. He is incapable of forming any opinion or judgment, because external objects make too feeble an impression; because the organs of transmission have lost a part of their energy, or because the brain itself has no longer sufficient power to receive and to retain the impression transmitted to it: hence the feebleness, obscurity, and incompleteness of the sensations and perceptions. Being unable to form a just idea of occurrences or objects, the demented person cannot compare them, or exercise abstraction or association of ideas; his mind has not energy enough to exert attention, or any mental operation necessary to the integrity of its functions. Hence the most incongruous ideas succeed each other, without dependence and without connection or order: hence he talks without being conscious of what he says; and he utters words and sentences without attaching to them any precise meaning. It seems as if unreal expressions were heard by him in his head, and as if he repeated them in obedience to some involuntary impulse, the result of former habits, or fortuitous associations with objects which strike his senses.

149. A loss of the powers of perception, of attention, and of suggestion or association of ideas, and the consequent defect, or entire loss of memory — of the powers of consciousness and of intellection (see note, § 66.), — are manifestly the earliest and fundamental changes constituting dementia, whether in its *primary*, or in its *consecutive forms* (§ 150, 151.). Hence the want of sequence or connection between the ideas, the intellectual imbecility, and the assemblage of phenomena, which I have stated this disorder to present. It must be obvious that, originating in the failure of those fundamental powers, dementia will *vary in grade*, with the amount of such failure; and that the resulting effects, manifested by the higher faculties and by the moral emotions, will also vary, not only in degree, but also in kind, according to previous habits, disposition, &c. — giving rise, at first, to *imbecility* or to *incoherence*, the two slighter grades of *dementia*.

150. Incoherency, imbecility or complete dementia, appears either *primarily*, from the operation of the predisposing and exciting causes upon the mind or constitution; or *consecutively* upon other disorders of the mind or brain, which, by their long duration, or their severity, affect the alliance of the former with the latter, and the intimate condition of structure of the brain more especially. When dementia occurs *primarily*, it is usually caused by whatever overwhelms the powers of the mind, or completely exhausts them, as inordinate mental exertion, vehement emotions, protracted and inordinate anxiety; and, as I shall have to point out hereafter, it may thus appear primarily, not only as simple incoherency, but also complicated with general paralysis or epilepsy.

151. Where dementia takes place *secondarily*, it is generally directly consequent upon protracted mania, or upon partial insanity, or upon apoplexy, severe phrenitis, epilepsy, palsy, irregular gout, or fevers attended by cerebral determination and severe or protracted delirium. This consecutive state of dementia has been termed fatuity: it was confounded with idiotcy, until ESQUIROL very accurately distinguished between them; and showed that dementia is exhaustion or obliteration of an intellect which was once sound, by intense mental causes, or by maniacal or other diseases; whereas, idiotcy is a congenital state of fatuity, or an original want of the intellectual powers. The idiot, he remarks, has never possessed the faculties of the understanding sufficiently developed for the display of reason. The victim of dementia was once endowed with them, but has lost this possession. The former lives neither in the past nor in the future; the latter has some thoughts of times past, reminiscences which excite in him occasional gleams of hope. The idiot, in his habits and manners of existence, evinces the semblance of childhood; the demented person preserves, in his conduct and acts, the characteristics of consistent age, and bears the impress derived from the anterior state of existence. Idiots and Cretins have never possessed memory, judgment, sentiments; scarcely do they present, in some instances, indications of animal instincts; and their external conformation plainly indicates that their organisation is incapable of thought.

152. M. ESQUIROL has distinguished *three varieties* of dementia, — viz., the *acute,* the *chronic,*

and the *senile*, — either of which may be *simple*, or *complicated* with melancholia, mania, epilepsy, convulsions, scorbutus, and especially with general paralysis. — The *first variety*, or *acute dementia*, is caused by gross irregularities of regimen, diet, &c., by fever, hæmorrhages, by metastasis, suppression of accustomed discharges, and a lowering treatment of mania. It is sudden in its attack, is unattended by lesion of movement, and is curable by means of regimen, exercise, and restoratives, by the removal of the cause, &c. — The *second*, or *chronic dementia*, is either primary, or consecutive upon the diseases just mentioned, more frequently the latter. When it succeeds other forms of insanity, as mania or monomania, it preserves some traces of the character of the primary disorder, or of the dominant idea during the previous affection. When it is caused by drunkenness, it presents peculiar characters, the chief of which are general tremor, false perceptions, rapid pulse, general perspiration, &c.; and it closely resembles *delirium tremens*, — which, indeed, may be more correctly viewed as an acute form of dementia, than as a distinct malady. When dementia arises from this cause, it more frequently assumes an acute and a curable form, than a chronic and persistent state, — a circumstance which seems to have escaped M. ESQUIROL. — The *third variety*, or *senile incoherency*, comes on gradually with the progress of age, and shows itself in the loss of memory and of sensibility, in the weakness of the impressions and sensations, of attention and perception; in the vacillations, and uncertainty of the will; and in the slowness and incapability of motion.

153. Dr. PRICHARD considers that incoherency presents *four stages*, or *degrees*, consisting of different phenomena; the description of the one stage not being applicable to the other. If the disorder commences in the first degree, it goes on successively to the more advanced; but the more severe degrees may appear at once, as the immediate effects of causes which destroy the powers of mind, or produce disorganisation of the brain. — The *first stage*, or degree, he remarks, may be termed that of *forgetfulness*, or loss of memory. Its chief characteristic is a failure of memory, especially as to recent events. — The *second stage* brings with it a total abolition of the power of reasoning, depending on a loss of voluntary control over the thoughts. It may be termed the state of *irrationality*, or *loss of reason*. — In the *third degree*, the individual is incapable of comprehending the meaning of any thing that is said to him. It may be styled the stage of *incomprehension*. — The *fourth stage* is characterised by loss of instinctive voluntary action. The individual is destitute of even the animal instincts; he cannot obey the calls of nature. This is the stage of *inappetency*, or *loss of instinct or volition*.

154. The *first* of these, however, does not amount to dementia. It is often a premonitory state, or stage, which passes into complete incoherency or imbecility; but it as often continues simple, and stationary, without passing into more marked disorder. This is especially the case in old persons. They often lose their memory, particularly of recent events; and their sensibility, and the power of quick or rapid movement, become impaired. Recent impressions in them are weak; and hence they live upon past recollections, which they have pleasure in recalling. But their powers of reason and their judgment are not materially weakened; and, until these become very manifestly affected, they cannot be viewed as presenting even the slightest form of this species of insanity. — The *second* and *third grades* of dementia particularised by PRICHARD, are the common forms in which the disease occurs in either its primary or its secondary states. In these the powers of reason are lost; and the patient is as unable to control his ideas, as he is incapable of comprehending the meaning of any thing to which his attention may be called. The *fourth grade* is identical with the variety of general insanity about to be noticed, under the head of *Fatuity*, or annihilation of the powers of mind (§ 164.).

155. *α*. The *slighter forms* or *grades* of dementia, or *incoherency* and *imbecility*, are evinced by a loss of control over the ideas, and of the faculty of attention. The individual occasionally apprehends something of the meaning of a question; but, before he has uttered half his reply, he becomes confused or bewildered, and is turned aside from it by some accidental or new suggestion. His expressions are consequently irrelevant and absurd. In this state, his memory may not be altogether lost, though very much impaired, and glimmerings of reason are occasionally evinced. He affixes some meaning to his expressions, but he soon loses or forgets it. He may know his friends, but he displays no signs of sensibility or of emotion on being visited by them. In such cases, the *incoherency* is remarkable. In others, the impairment or loss of the powers of consciousness and of intellection (see note, § 66.), and a state of intellectual *imbecility* are more or less manifest. — Some patients, in these states, are capable of being employed in mechanical occupations, and particularly in what they had previously been habituated to; but even in these their imbecility is often conspicuous. Others, particularly when dementia is consequent upon mania, experience occasional paroxysms of excitement, in which the symptoms of more active mental disorder become prominent.

156. *β*. The *severer* or *confirmed states* of dementia are characterised by inability to comprehend the meaning of any question, however simple. Reason is entirely lost, and the person acts from instinct or habit. The physical activity is often remarkably displayed in this state of the disease. Some jump or run to and fro, or walk round in a circle; or dance and sing, or occasionally vociferate. Others cry or laugh by turns, or almost at the same time, or utter the most unmeaning jargon, or words without ideas, or mutter broken sentences, or expressions without any connection, or evincing the most trivial association, which may depend upon accidental sound, or some sensible object attracting momentary attention. Many sit in silence, with a sedate look, or a vacant smile, or an unmeaning stare, and hardly utter a word for weeks, months, or even years. Some crowd round a stranger and gaze at him, having intelligence barely sufficient to perceive something new; and others have a propensity to ornament themselves in a strange or a fantasticmanner, or to add whatever may be in their way to their dress, which is always singular or ridiculous. A few continue crouched in a particular posture, which they always prefer, though it seems the most un-

easy or painful; and, if placed in a different position, they soon resume their accustomed posture.

157. *γ*. The disorder of the sensibility and of the understanding is, to a certain extent, pourtrayed in the *countenance*. The features are motionless and devoid of expression. The look is wandering or vacant. The face is pale; the eyes are dull and moistened with tears; the pupils are dilated; and occasionally the features are distorted from relaxation of some of the facial muscles. The body is thin and emaciated in some cases, and full and fat in others. In these latter, the face is full, and the conjunctiva occasionally loaded. In a few, but little indication of mental disorder is evinced by the countenance.

158. *δ*. The *bodily*, and especially the *organic, functions*, are not materially disturbed. Sleep is sound and prolonged. The appetite is unimpaired, or it is increased almost to voracity. The alvine evacuations are free, sometimes fluid; and in many cases corpulency supervenes. Occasionally, when mania or monomania is about to pass into dementia, the transition is indicated by obesity. When paralysis appears in the course of the disease, the paralytic symptoms manifest themselves slowly and successively. Articulation is first impaired, afterwards locomotion is executed with difficulty, and, lastly, the evacuations become involuntary. But this complication is only contingent, and as such will be noticed hereafter.

159. *ε*. The *course* of dementia is occasionally *acute*, but much more commonly it is *chronic*. It is *simple*, or *complicated* in the manner about to be noticed. It is generally *continued*, but it is sometimes remittent, or even intermittent. Its duration is most various, from a few days or weeks, to many years.

160. *b*. The *Diagnosis* of dementia cannot be difficult, excepting at the time when mania or monomania is passing into this state; and then the symptoms will indicate the predominance of either. Maniacs and monomaniacs are carried away by false sensations and perceptions, by illusions and hallucinations, by the excitement, the exuberance, and the determined character, of their ideas and of their emotions: the demented person neither imagines nor supposes any thing: he has almost no ideas; be neither wishes, nor determines, but yields to every the slightest impulse or suggestion: his cerebral power is exhausted. In the maniac or partially insane, every thing announces power and strong effort; whilst, in the demented person, every thing betrays relaxation, feebleness, or complete mental impotence.

161. *c*. The *Causes* of which dementia is more especially the consequence, are either moral or physical; but the two orders are often associated, or the one is accessory to the other, in their operation.—*Moral causes* affect females more frequently than males, and the higher than the lower ranks of society; but are much less influential in occasioning this than the other forms of insanity. They are chiefly — excessive or frequent excitements of the passions, domestic unhappiness, political commotions, frights, sudden grief or joy, disappointed affection and ambition, misfortune and want.— *Physical causes* are the most concerned in occasioning this species of insanity. The progress of age, fevers with cerebral determination or predominant affection, congestion and chronic inflammation of the brain and its membranes, the cessation and disorders of the catamenia, are the most common of this class. After these follow — masturbation and venereal excesses, the abuse of intoxicating liquors and of narcotics, the excessive use of mercurials, parturition and the accidents consequent upon it; epilepsy, apoplexy, palsy, injuries of the head, and excessive or prolonged mental exertion, especially when prematurely commenced, or before the brain is duly developed, suppression of cutaneous eruptions, of gout or rheumatism, and of accustomed discharges, have likewise caused, or contributed to cause, dementia. This species of mental disease is, however, most frequently consequent upon mania, or some one of the several forms of partial insanity, especially when these have been treated by too large sanguineous depletions, or by other too active and lowering means.

162. Hereditary conformation or influence, the phlegmatic and lymphatic temperaments, debility caused by irregularities and excesses, and exhaustion of cerebral power by these or by inordinate indulgence of the passions, weak, timid, or irresolute constitutions of mind, and original feebleness of the intellectual powers, *predispose* to dementia.

163. *d*. The *Prognosis* of dementia is extremely unfavourable, especially as respects the more severe cases. In the milder states or stages of the malady, a few instances of recovery occur, especially when a paroxysm of acute mania supervenes. The apparent reaction of the system is, in these cases, sometimes followed by perfect rationality. Attacks of fever attended by delirium are often fatal to lunatics; but of those who recover from them, not a few have their faculties restored to them. When the physical health of persons in dementia improves at a time when the mental disorder seems to be increasing, and especially if they eat, sleep, and digest well, and become fat, recovery may be almost despaired of. If any of the *complications* about to be noticed take place, recovery can no longer be anticipated. Even in this state, patients may linger for many months, or even years, until carried off, by the extent of cerebral lesion, or exhausted vital power, or by the complications of the malady, or rather by the organic alteration on which the complications more immediately depend.— The *changes* found on dissection of fatal cases will be described hereafter.

164. C. FATUITY, or *Annihilation of the Powers of Mind.* — This may be viewed as the last stage, or an extreme degree of dementia, but it sometimes follows almost immediately upon mania or some one of the forms of partial insanity. — *a*. In this state, all the mental powers, and even most of the animal instincts, are lost. The individual continues to possess a state of organic existence, but deprived of all the functions of the brain, and nearly of all the functions of sense. He is scarcely conscious, evinces little or no desire or aversion; is often unable to control, or is not cognisant of, the calls of nature. One stands in a state of vacant unconsciousness; another sits rocking himself to and fro, or yelling or chanting unmeaning words; a third is quite motionless, with his head hanging on his breast, or with his eyes and mouth half open. In this state, the patient is often destitute of the feelings of hunger or thirst, and occasionally even of that of pain. He may linger in this condition for years, but he can never altogether recover from it. A few may be roused, by favourable circumstances, to a less extreme state of mental

annihilation than I have described, — to a state of dementia above this in the scale of intellectual privation, — but a relapse always occurs after a short time.

165. *b*. Fatuity is often *complicated* with partial or general paralysis; and, occasionally, attacks of convulsion or of epilepsy take place, and sometimes terminate this state of existence. In most instances, and especially when fatuity is complicated, the countenance assumes a peculiar character, owing to the absence of all action in the muscles of the face, to the general relaxation of the features, and to the laxity of the integuments of the cellular tissue. The whole frame indicates, by a flabby state of the tissues, the exhausted condition of cerebro-spinal nervous power. — The organic functions are generally but little disordered, excepting as respects the processes of excretion. Owing to defective voluntary control, and the unconscious state of evacuation, the patient often presents a state of disgusting filthiness, difficult to be prevented, and requiring strict attention, in order that the consequences to which neglect uniformly leads may be warded off.

166. ii. COMPLICATED INSANITY.—The several forms of insanity — of the partial as well as the general disease — are often variously complicated. Not only may the different varieties of partial insanity be associated in numerous modes; but general insanity may present, especially when consequent upon monomania, a predominance of disorder as respects certain ideas, feelings, or trains of thought. I have already shown, that moral insanity often passes into disorder of the understanding; and that, in such cases, not only both states of derangement subsist, but some additional disorder, in many instances, is at last superadded. Thus, states of general alienation, more or less complete, are often ultimately developed, presenting either of the states of mania or of dementia, often with prominent disorder on certain subjects, or a disposition to entertain certain emotions or ideas in preference to any other. These states of alienation, however, can hardly be denominated complications, inasmuch as they are various modes in which the mental disorder generally goes on increasing, when uncontrolled by treatment, until the powers of mind are altogether overturned, or even annihilated. The morbid associations, therefore, to which I now proceed to direct attention, are strictly complications, or contingent associations of bodily disease with insanity, and are of so frequent occurrence, and of so great importance in regard of the course and termination of the cases in which they are observed, as to require a particular notice. The circumstance, also, of the mental disorder, and the contingent bodily disease, generally proceeding from a source common to both, — from derangement of the circulation within the cranium, and often from organic lesion, either intimate and hardly appreciable, or gross and obvious, — also demands a more special consideration of this subject.

167. *A*. The COMPLICATION WITH GENERAL PARALYSIS is the most common and the most important of any that occurs in practice. I have already fully described its different *stages* or *degrees* (§ 33. 36.), and shall notice, at this place, certain particulars only that did not fall within the scope of that description. This form of paralysis is often indicative of chronic inflammation of the meninges, and is distinct from the paralytic affections consequent upon cerebral hæmorrhage, or upon softening, tumours, &c. of the brain,— which, however, may also be complicated with insanity, although much more rarely than the general form of the affection above described. It, in a few instances, precedes, and in most supervenes upon, the mental disorder. It sometimes appears with the first symptoms, or during the acute period, of insanity; and generally commences in the manner I have stated (§ 33.), and increases as the mental powers diminish. Whatever form the mental disorder may have presented, it soon passes into chronic dementia, when complicated with paralysis. It generally terminates the life of the patient within three years; death being preceded by cerebral congestion, convulsions, diarrhœa, and gangrene of those parts sustaining the weight of the body when muscular support has been lost. This form of paralysis is much more frequent in men than in women. Of 109 insane paralytics under the observation of M. ESQUIROL, during three years, at Charenton, 95 were males. Of 609 lunatics admitted at this institution, in three years, 109 were paralytics; — the proportion in males and females being — in 366 male lunatics, 95 were paralytics; and of 253 females, 14 were thus affected. Of 334 lunatics in the Asylum of St. Yon, near Rouen, 31 were paralytics, — of whom 22 were men, and 9 women. At the Bicêtre, the proportion of paralytics to the number of lunatics is much smaller. It is observed by M. ESQUIROL, that this complication occurs most commonly in those lunatics who have caused their insanity by venereal excesses, by intoxication, by the abuse of mercury, and by mental exertion,— circumstances which account for the greater prevalence of it in males than in females. The lunatics at Charenton, where it is most frequently observed, have been in easy circumstances, and have possessed means of gratifying their passions, or have exercised professions which have excited or over-exerted the brain, without duly exercising the body.

176. According to M. CALMEIL, this affection has generally, at Charenton, appeared soon after the commencement of insanity; but it sometimes has not occurred until insanity has continued for many years. A few individuals have displayed all the vigour of intellect for some time after they were attacked by it, and derangement has afterwards taken place. If the mental disorder has not already proceeded, it very rapidly proceeds, in this complication, to advanced or complete dementia; yet persons thus affected preserve their appetites, or have them greatly increased. They are in all other respects in health. The circulation is natural, and the sleep undisturbed. They continue plump, but the soft solids are flabby and soft; and, as the disease proceeds, they are liable to constipation, often followed by diarrhœa, by unconscious evacuations, and by want of power over them, owing to palsy of the sphincters. Retention and incontinence of urine generally also take place, and aggravate the evils to which the paralytic person is liable.

168. *a*. The *duration* of this complication is various; but is reckoned by MM. ESQUIROL and CALMEIL to average about thirteen months; very few surviving longer than three years with it.— The ultimate *prognosis* is most unfavourable. M. ROYER-COLLARD, after an experience of twenty

years, had not met with one instance of recovery from it. M. CALMEIL has seen only two cases, thus complicated, that recovered; and M. ESQUIROL has mentioned only three. The appearances observed after death will be stated hereafter.

169. General paralysis is apparently more frequent in Paris than elsewhere. There can be no doubt, however, that it has been more accurately observed amongst the insane in that city, and indeed through many parts of France, than elsewhere. Dr. BURROWS had stated it to be comparatively a rare disease in England. M. ESQUIROL doubted this, and inferred that it was considered rare, because it it had not been accurately observed in this country. There is much truth in this, as shown by the recent inquiries of Dr. PRICHARD. This physician states, that he had made many inquiries with a view to determining this question, but had met with considerable difficulties in obtaining satisfactory information. The facts, however, which he has adduced, prove that this is a frequent complication of insanity in this country, although not so frequent as in Paris; and in every respect confirm the accuracy of the observations furnished by MM. ESQUIROL, CALMEIL, and other French pathologists.

170. *b.* There is a modification of paralysis, as Dr. PRICHARD truly remarks, of frequent occurrence, during protracted insanity and dementia, in English hospitals for lunatics, that differs in duration, and in some of its features, from the general paralysis so accurately described by the French writers. It resembles the debility or decrepitude of extreme old age. Patients affected by it, sit crouched with their heads hanging down; and when they attempt to raise themselves into the erect posture, their limbs tremble, they stoop, and totter. Some stand leaning against a wall for whole days, with their bodies curved forward, their heads and necks hanging down, and their upper extremities shaking and hanging useless. Such patients are always in the most advanced stage of dementia, and often continue in this state of paralytic decrepitude for many years. Some become bedridden, and remain long incapable of any voluntary movement, until at length either the powers of life are gradually extinguished, or they are carried off as in the form of paralysis previously described (§ 33.).

171. *c.* Paralysis from cerebral hæmorrhage, from softening, from tumours, or from other organic lesions of a portion of the brain, is also observed in insane patients, but not so frequently as the varieties of this affection already noticed. In these cases, it generally assumes the form of hemiplegia; but it sometimes continues in a partial or limited state,—being confined to one arm, or to the muscles of one side of the face, or to the arm and face, for a considerable time. It may even proceed no further, although more commonly it passes into palsy of the whole side. In these the attack is gradual, slow, and *chronic;* and usually proceeds from softening, or from some other change of structure, in a portion of the brain or of its membranes. In other cases, the paralytic affection is more sudden and *acute*, and is consequent upon an apoplectic or comatose state, or upon an epileptic or convulsive seizure. It may be at at once hemiplegic; or it may be at first more partial, and become more complete, either gradually, or after relapses or repeated attacks of sopor or convulsion. This more acute form of palsy seems to proceed from congestion or sanguineous effusion in the brain; but it has occurred without any organic lesion having been found to account for it. (See *Appearances in the Brain, in Paralytic* INSANITY.)

172. The more usual forms of paralysis may precede the insanity; but they most frequently take place in the more confirmed and chronic states of mania, and especially in dementia and fatuity. They are evidently more or less intimately connected with the pathological conditions upon which insanity depends, as well as with the consequences which these conditions produce, as will be shown hereafter. Whilst palsy in the insane is generally incurable, insanity is equally so when thus complicated.

173. *B.* VERTIGO, or *Giddiness*, often precedes and accompanies insanity. The two forms of vertigo — the one from active congestion of blood in the brain, the other from a defect of the supply of blood to this organ — may attend mental diseases. It is extremely necessary to distinguish between these two opposite conditions of the cerebral circulation, with reference to this affection. When vertigo proceeds from the former state, it is characterised by a sense of rapid gyration in the head, by throbbing in the temples, a beating noise in the ears, succeeded sometimes by vomiting or nausea, and occasionally by loss of consciousness: when it arises from the opposite condition of the circulation, it resembles a gradual swimming,—objects appearing as approximating, or receding from, the organs of vision, or becoming dark, — and is attended by a sense of faintness. It is requisite to attend to these two very different forms of vertigo, inasmuch as they indicate important and opposite states of the cerebral circulation; and, as in the more partial forms of insanity, they often precede the accession of mania, or the occurrence of some dangerous complications.

174. *C.* EPILEPSY and CONVULSIONS are frequent complications of every variety of insanity. Either of these affections — either the regular paroxysm of epilepsy, characterised by sudden loss of consciousness, frothing at the mouth, injury of the tongue, and subsequent sopor; or the more gradually developed fit of convulsion, in which these phenomena are not present — may precede or follow the mental disorder. In every instance, congestion or determination of blood to the head becomes remarkable during the paroxysm, although there may have been a deficient supply of blood to this quarter shortly before. The occurrence of these complications is generally owing to insolation, to suppression or disorder of the catamenia, to violent excitement or exercise, especially during warm weather, to injudicious bathing, to the use of intoxicating liquors, to venereal excesses and masturbation, to habitual gluttony or excesses at table, and to the other causes enumerated in the articles on these diseases. Epilepsy occurs most frequently in those who have complained of vertigo, headach, incubus, and of restless dreaming sleep; and an attack is generally preceded by some of these symptoms, or by an aggravation of mental disorder.

175. Insane persons, predisposed to epilepsy or convulsions, as well as epileptics disposed to insanity, generally present a peculiar prominence of the eyes, sometimes with a puffy or wrinkled state

of the surrounding integuments, partly arising from congestion of the blood-vessels, and particularly of the veins, in the vicinity. This is observed also in mania, and still more so in epileptic mania. The eye also has a kind of glaze over it, distinguishing it from the convex eye of near-sighted people.

176. When an attack of epileptic or other convulsions is followed by mania, or any other form of mental disorder, the latter often disappears, sometimes in a few days or weeks, under judicious treatment; but it always returns with the convulsive affection, — and after repeated attacks, the mental disorder becomes more severe, more general, as respects the mental powers, and more confirmed, until the patient rapidly sinks into dementia or fatuity, in which state apoplexy, or some one of the forms of palsy, is sometimes superadded. In this case, life is terminated, after an uncertain time, either by a paroxysm of convulsion, or by one of the later complications. Although epileptic mania generally pursues this unfavourable course, when neglected or injudiciously treated, yet it sometimes admits of alleviation, or even of cure, when judiciously managed. — When epilepsy or convulsions occur in the course of any of the more chronic forms of insanity, the latter is very rarely cured; if death does not take place soon, it lapses into complete dementia or fatuity.

177. Mania complicated with epilepsy is characterised by ferocious, malign, and often murderous paroxysms, or exacerbations, which frequently take place most suddenly. The fury of the patient is sometimes directed against himself; but oftener against others, especially those he most loves when sane. Dr. BURROWS observes, that when paroxysms of mania suddenly attack persons subject to epilepsy, a reckless fury is exhibited by them, different from the characters of true mania. It seems as if the epileptic impulse, when not ending in convulsion, acts upon the brain in a peculiar mode, imparting to it that particular action denominated epileptic mania. The most horrible actions have proceeded from this complicated form of insanity. Sometimes the destructive paroxysm or impulse is produced by some fanatical opinion or idea, prompted by a misconstruction of some scriptural passage, by some delusion, or waking dream. Persons thus affected may have lucid intervals of considerable duration. But although the paroxysms are sometimes preceded by some signs or symptoms, yet they are often so sudden that mischief is occasionally done before it can be prevented. Hence epileptic maniacs should not associate with other insane persons, — and especially as the sight of epileptic paroxysms may produce the like in other maniacs. The appearances observed after death in epileptic and convulsive insanity will be noticed hereafter.

178. *D.* APOPLEXY may be the *cause* of insanity, or it may be the *consequence* of those intimate lesions of structure which either occasion, or are connected with, the mental disorder. ESQUIROL considers that apoplexy constitutes a sixth of the physical causes of mental alienation, and an eighth of the deaths. Dr. BURROWS thinks, that it is not so frequently a cause of insanity, or of death, in this country, as M. ESQUIROL states with reference to France. When apoplexy is connected with the production of insanity, it is generally congestive or hæmorrhagic; and, in the latter case, is generally followed by paralysis, — the mental disorder being complicated with hemiplegia, or with a more partial form of palsy. Apoplexy with effusion of blood generally occurs early in the mental disorder, and commonly in the maniacal form. When apoplexy precedes mania, there is often a great change perceived in the moral and intellectual character, for some time before the attack. Dr. BURROWS justly remarks, that this change in the character may usher in an apoplectic as well as a maniacal paroxysm; and hence the affinity between sanguineous apoplexy and mania is evident.

179. The sudden deaths, however, which take place in chronic mania, and in confirmed dementia, and in the complication of insanity already noticed, are seldom produced by cerebral hæmorrhage. They were formerly ascribed to *serous* apoplexy; but as I have shown (see APOPLEXY, § 115.) that the form of this disease, usually imputed to the effusion of serum, depends rather upon exhausted organic nervous power, in connection with congestion, or interrupted circulation of the vessels of the brain, than upon effusion, — which, even when present, is seldom in such quantity as to account for the fatal event, — so it may be inferred that sudden deaths in these chronic forms of general insanity are chiefly owing either to congestion, or exhaustion of nervous power. The fatal attack either commences with sudden or profound coma, which is soon followed by convulsions; or it begins with convulsions, which are soon succeeded by coma, rapidly terminating in death, — the apoplectic or the convulsive state being thus consecutive, or both, in a few instances, being simultaneous. Either of these forms of attack is often immediately consequent upon a paroxysm of furious mania, or of delirious excitement; and, in some cases, a state of acute or furious delirium, or of insane agitation, terminates at once in death, without convulsions or coma — at least, of any appreciable duration — having preceded the fatal event. This termination, which may be viewed as a form of apoplexy, has been noticed by PINEL, ESQUIROL, BURROWS, and others, who have described it as occurring only in old and cachectic cases, and as being preceded by a sudden accession of maniacal or delirious excitement, which soon ceases, and the patient dies, as if from exhaustion of vital energy. On dissection, but little is found in the brain to account for the event; and the body soon passes into putrefaction. These forms of apoplectic attack are identical with those which I have ascribed, in the article APOPLEXY, to exhaustion, or loss of the organic nervous energy of the brain, — a state formerly noticed by BOERHAAVE, and designated by him *Apoplexia defectiva.*—It is probable, however, that, in the cases of insanity, in which the sudden death is consequent upon distinct evidence of general cachexia, the event is caused rather by sudden privation of power in the heart, or by sudden congestion of the lungs, or other affection of these organs, than by loss of the nervous energy of the brain.

180. A state of profound and continued *coma* occurs in the course of a few cases of insanity. It may follow mania; and I have seen it, in one instance, consequent upon moral insanity. I believe that it takes place chiefly in those states of mental disorder which have been produced by depressing

causes. The two cases which I have had an opportunity of observing, have been prolonged, and evidently owing to exhaustion of the vital manifestations of the brain. Restoration took place from this state, but the powers of the mind were never, even partially, recovered. The *apoplectic* and *comatose* complications, especially of chronic mania, of dementia, and of fatuity, — particularly when terminating quickly in death, or characterised by sudden collapse or exhaustion of nervous power, — occur most frequently in winter and during cold weather, and are occasioned chiefly by causes which depress or exhaust the powers of life.

181. *E.* HYSTERIA, CATALEPSY, and CATALEPTIC EXTASY also occasionally precede, and occur in the course of, insanity. The two latter affections, however, are rarely met with, but have been observed by HALLER, BOERHAAVE, LIEUTAUD, TISSOT, PARRY, BURROWS, and myself,—chiefly, however, as antecedents of insanity. Hysteria is observed most frequently at the commencement of mental disorder; and it sometimes passes into a state of moral or partial insanity, which after a time subsides. Hysteria is often associated with hypochondriasis; and both when thus associated, and when severe and prolonged or habitual, insanity is occasionally consequent upon, and subsequently more or less manifestly complicated with, it. It is of the utmost importance, in practice, to recollect the connection, when females come under treatment. In these cases, the mental disorder, as well as the hysterical affection, proceed from a common source: uterine irritation or disease is propagated to the cerebro-spinal nervous system, and the functions of the brain are consequently more or less disturbed.

182. *F.* DISORDER OF THE DIGESTIVE AND ASSIMILATING ORGANS very generally *precede* and *complicate* disorders of the mind. I am persuaded, that much too little importance is attached to this circumstance, in respect both of the pathology and treatment of insanity. The organic functions are often generally deranged — commonly more or less weakened — long before the mind is affected. Digestion is impaired, although the appetite may be natural or even increased; and the bowels are generally torpid, and require large doses of purgatives to act upon them. They are sometimes irregular, from irritation of the digestive mucous surface having reached a considerable pitch, or from the presence of offending matters. The secreting and assimilating functions of the liver are likewise impaired; — the bile is either scanty, or retained in the ducts or gall-bladder, until it acquires irritating and morbid states; and the vital influence of this organ on the venous blood circulating through it is insufficiently exerted. Hence the chyle is imperfectly prepared, and the blood abounds either in unassimilated elements, or in materials which require to be eliminated from it. To these circumstances especially are to be attributed much of the disorder consecutively observed in the functions of the brain, of the lungs, and of the heart; and, at length, many of the organic lesions of these organs, which complicate, and ultimately terminate, the more severe cases of mental disease. The general *cachexia* often preceding insanity, and still more manifestly attending it, is the result of the morbid states of the chyle and blood consequent upon deficient organic nervous energy throughout the digestive and assimilative organs. Many of the structural changes, as well as the scorbutic state of the body, which very often take place in the more chronic cases of insanity, proceed from the morbid conditions of the fluids, consequent upon this impaired state of nervous power.

183. BROUSSAIS, and most of his followers, have attributed the disorder of the digestive organs preceding and attending insanity, to *chronic inflammatory irritation of the gastro-intestinal mucous surface;* and have even considered the mental affection to be frequently symptomatic of, or caused by, the disorder of this surface. Without disputing the occasional presence of chronic gastro-enteritis, both previously to, and associated with, mental derangement, I believe that, when it is present, it is chiefly contingent upon the state of organic nervous influence just contended for, and upon the irritating state of the contents of the alimentary canal, arising out of imperfect digestion, and a morbid condition of the secretions poured into it. This subject, however, will be further noticed hereafter.

184. *G.* There are *various other diseases* which arise in the course of insanity — or are contingent upon it, — and which even cause its fatal termination in many instances. The chief of these are consumption, diseases of the bowels, scurvy, organic lesions of the heart, dropsical effusions, gangrene, &c. These are actually complications, inasmuch as the mental disorder generally proceeds in connection with them for a longer or shorter period, and as they have little or no influence in terminating the mental disorder otherwise than in death. Some of them, particularly diseases of the lungs and pleura, may suspend it, or cause it to intermit, but they have no further influence over it, of a beneficial kind. They, however, often tend to aggravate it, or to cause the slighter and more partial forms to pass into those more general and severe. I shall notice them further in the following chapter.

185. IV. TERMINATIONS OF INSANITY.—i. PROGNOSIS. — Insanity terminates either in *recovery* or in *death;* but it may be said to terminate otherwise, when one variety lapses into another, especially into one of a severer or more complicated form, or when one alternates with another. Although this transition of one state of disease into another closely allied to it, cannot be strictly considered as a termination of it, yet it requires notice, as possessing great practical importance. Much of the information upon which opinions are to be formed as to the results of mental disease, is furnished by the statistics of lunatic asylums — sources of notorious inaccuracy in this country, especially up to a very late period. Much of this inaccuracy arises from the regulations by which those institutions are governed, — from the classes of patients which they receive or reject, — and from the periods their inmates are allowed to remain under treatment. Many recent cases, both acute and slight, are treated in private practice, and recover in a short time, which do not come into any account either of the number affected, or of the number cured. The systems of treatment pursued in different asylums, public and private, and in states of individual seclusion, are so diversified, — in many instances, most inappropriate — in some, calculated to aggravate and perpetuate the malady — in others, altogether inert — in numerous

cases, without the least reference to very manifest physical disorder, characterised by obvious symptoms and signs — and in not a few, without regard to intellectual or moral guidance, — that numerical results obtained from these sources may flatter those who rejoice in a parade of precise details, without considering the soundness of the data upon which they are calculated, or the fallacies which are involved in them, or the unsound inferences which they encourage and propagate, but can never satisfactorily inform those who look for instruction from unexceptionable, and from, at least, tolerably instructed, quarters. In a country, where the institutions — public and endowed as well as private and mercenary — for the greatest and most humiliating of human calamities, are shut against professional instruction, — where these institutions, and those to whom their medical management is intrusted, furnish the least possible modicum of professional information, — where asylums are made more for the profitable and safe custody of the inmates, than for their recovery, — what can be hoped from statistical and numerical statements, but mystification, if not positive deception. Whilst, therefore, I adduce such information as I can obtain, I give it with due note of its imperfections, that it may not be estimated above its real value. There are, however, some sources — especially those to which most frequent reference is here made — that deserve somewhat more of confidence than should be reposed in many others.*

186. *A.* THE DURATION of insanity is most various. The disease has subsided, in some cases, within a few days from its commencement; in others, it has continued for twenty, thirty, or even forty years. — *Recoveries*, as well as *deaths*, occur at all periods from the commencement of the malady. If neither of these events takes place at a somewhat early period, confirmed insanity generally succeeds, and sooner or later assumes the form of dementia, and sometimes ultimately passes into a state of fatuity. In this case, the malady goes on until it terminates in *death*, which takes place either in its simple or complicated states.

187. *B.* RECOVERY is the result in a large proportion of cases of insanity; but the proportion varies remarkably in the several forms and complications of the malady. It is very important, in respect both of the history and classification of the disease, and the *prognosis*, to determine, as accurately as possible, the number of cures in a given number of cases. But before the general results furnished by the imperfect sources already alluded to, or the estimates made from the reports of lunatic institutions, be at all considered, it will be preferable to take a view of the several circumstances which influence the event of the malady, but which vary in character, in combinations, and in their effects, in different countries, climates, places, and asylums. These circumstances are — the particular kind of mental disorder; its causes, predisposing and exciting; its duration, continuance, or recurrence; its existence in a simple or in a complicated state; the physical disease with which it is associated; and the age, sex, constitution, occupation, &c. of the patient.

188. *a.* The *form of the disease* has a marked influence upon its curability. M. ESQUIROL states that a greater proportion of the cases of mania is cured than of any other form of madness, and that dementia is scarcely ever cured; but, of 518 recoveries at Charenton during eight years, the numbers were — 263 cases out of 545 of mania; 251 out of 715 of monomania; and only 4 out of 281 of dementia. But of the aggregate of 1557 cases, there were 274 paralytics, 62 epileptics, and 15 idiots; so that the curable cases were 1205, and of this number upwards of two fifths were cured. He further remarks, that the greater sanability of maniacs comparatively with monomaniacs had place chiefly in males; monomania being, from this, more curable in females than in males. The following table will give a more precise idea of the results obtained by M. ESQUIROL at Charenton : —

Form of Disease.	Male Cases.	Female Cases.	Total Cases.	Males recovered.	Females Recovered.	Total recovered.
Monomania -	372	343	715	123	128	251
Mania - -	334	211	545	160	103	263
Dementia and Fatuity -	227	69	296	1	3	4
General Total -	933	623	1556	284	234	518
Deduct Incurable Cases -	-	-	351			
	-	-	1205	-	-	518=1 : 2·34

189. *b.* The *causes* have a manifest influence upon the event in mental disorder. But they are so variously associated in producing their effects, that it is very difficult to advance any precise statement on this topic. Hereditary predisposition, and the more powerful physical and moral causes, especially when combined, must be viewed as unfavourable circumstances. Indeed, all the causes which I have enumerated as especially influential in occasioning dementia may be considered in this light.

190. *c.* The *age*, *sex*, and *constitution*, of the patient are material considerations in forming a prognosis. — The most favourable *age* for recovery is between the 20th and 30th year. But few recover after the 50th year. M. ESQUIROL states, that, of 209 recoveries at Charenton, the greatest number of cases were from the 25th to the 30th, and from the 30th to the 35th year. This is the period of greatest vital energy, when acute mania oftenest occurs. Recoveries diminish progressively from the 45th year. The diminution is more abrupt in females, and more gradual in males. Twenty men, however, recovered after the 50th year, in which number were 4 out of 12 lunatics who had exceeded 70; so that advanced age does not preclude hope.

191. Insanity is, generally speaking, more curable in *women* than *men*. When it is evidently connected with a condition of the natural functions which is susceptible of change by medical art, or by the efforts of nature, or the progress of age, a hope of cure may be entertained on these grounds. Thus recoveries have often taken place in females at critical periods. M. ESQUIROL men-

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* On this subject, as well as on many others connected with insanity, much interesting remark will be found in an able analytical article in the 13th No. of the *British and Foreign Quarterly Review*, which came before me after a great part of this article was sent to press. It is at least consolatory, that the able author of this paper, and of an excellent work on Insanity, should be placed over the County Asylum.

tions instances of dementia in females which had continued from early youth, and had terminated on the appearance of the catamenia; and others which had commenced at that period, and had recovered when the catamenia ceased. When the disease has followed the suppression of an eruption or of an accustomed discharge, a cure may be hoped for, by re-establishing the suppressed evacuation or eruption, or by means which have a similar effect upon the constitution.

192. *d.* The previous *duration* of the disease has a marked influence upon the curability of it. The chance of recovery is very much greater in the early than in the advanced periods. Dr. WILLIS stated that 9 cases out of 10 were restored when they had been placed under his care within three months from the commencement of the attack; and Dr. FINCH has declared that 61 out of 69 patients recovered who were received into his asylum within the same period from the appearance of the malady. Dr. BURROWS, in his very excellent work, has reported 221 cures out of 242 recent cases. Dr. PRICHARD remarks, that 7 out of 8, or even a larger proportion, of recent cases have terminated successfully in the Retreat near York. This is as favourable a view of the result in recent attacks as can be entertained; and yet, when we consider that many recoveries from mental disorder take place in private practice without becoming known, and that the great majority of those cases which are admitted into institutions or asylums are either of some duration, or second or third attacks, or have withstood the treatment that had been adopted, it cannot be considered as being much too favourable as respects all very early states of this malady.

193. M. PINEL was the first, or amongst the first, to direct attention, by a memoir read at the National Institute in 1800, to the degrees of probability there existed of recovery at different periods of insanity. This eminent physician inferred, that a greater number of recoveries take place in the first than in any other succeeding month; and that the mean duration of the malady, in cases of recovery, is from five to six months. According, however, to M. TUKE and M. ESQUIROL, the mean duration of these cases is somewhat under one year. I believe that M. PINEL's conclusion is more correct as regards all instances of recovery, and especially as comprising recent cases, many of which are not comprised in the accounts furnished by public institutions; whilst M. ESQUIROL's inference is applicable chiefly to these and similar institutions. This writer states, that of 2005 female lunatics, 604 were cured during the first year, 497 in the second, 86 in the third, and 41 in seven succeeding years. From the tables furnished by him, and by Mr. HITCH, of the Gloucester Lunatic Asylum, to Dr. PRICHARD, as well as from other data, it may be truly inferred, that recovery is probable in proportion to the shortness of the duration of the malady. The importance of proper treatment at an early period, and the impropriety of sending a patient hurriedly off to a house of confinement, with no assurance of a proper system of treatment being persevered in, is very evident from these data, as well as from numerous other considerations. — A recent writer justly remarks, that cases are not wanting to prove, that the mind may recover even after many years have been passed in a state of insanity; and that such cases have sometimes been overlooked or concealed, there is too much reason to suspect. Instances are adduced by MM. BEAUMES, ESQUIROL, and CHAMBEYRON, in which recovery took place after madness had continued for twenty years, or even longer,— especially upon the establishment of a natural, or of a suppressed discharge, or of suppuration, or some extensive counter-irritation or evacuation. From Mr. HITCH's tables it would appear, not only that the greater number of cures occurred in recent cases, but that, in some, recovery took place in a short time after admission, although the disease had been of long anterior duration. Of five patients, insane for ten years, one was cured in nine months, one in ten months, the third in a year, and the other two in six months; and one who had been insane forty years was cured in four months. Three other cases recovered after eleven, seventeen, and twenty years. These facts are sufficient to prove that, from the long duration of the disease alone, recovery is not altogether to be despaired of.

194. *e.* The *complications of insanity* very remarkably influence the terminations of it. The association of any of the forms of the disease with general or partial *paralysis*, and of dementia especially with general palsy in any grade, is a most unfavourable circumstance, — recovery hardly ever taking place, as shown above (§ 168.), in any of these cases. — The complication with *epilepsy*, or *convulsions*, is also most unfavourable. When mania is consequent upon severe attacks of epilepsy, or when the maniacal affection is very violent in the intervals of these attacks, few or no hopes of recovery should be entertained. When, however, convulsions appear during the high excitement of mania, a somewhat more favourable opinion of the event may be formed. — The antecedence, or supervention, of *apoplexy*, or of *coma*, is a circumstance admitting of as few hopes as the preceding complication. — The occurrence of *phthisical symptoms*, or of obstinate *diarrhœa*, in the course of the mental disorder, especially when the latter is not followed by amendment, generally indicates a more or less speedy termination in death.

195. *f.* The *seasons* have a slight influence on the issue of insanity. Mania is more frequently cured in summer and autumn. The month of October presents the greatest number of recoveries; the month of February the fewest. Males are more frequently cured in July and November, females in October and May. Of 518 cures, M. ESQUIROL found, that 92 took place in winter, 123 in spring, 145 in summer, and 158 in autumn.

196. *g. As to the proportional number of recoveries in various countries and places*, great differences are found to exist; depending chiefly upon the restrictions, or the latitude, observed in public institutions, as to the admission and retention of patients. Dr. BURROWS states, that 240 cures were affected, in his practice, in an aggregate of 296 cases of various kinds; 221 recovering out of 242 recent cases, and 19 of 64 old cases, or 81 in 100 of all cases, and 91 in 100 of those which were recent — a proportion much greater than that furnished by any other source; but very nearly agreeing with the statements of Dr. WILLIS. Dr. JACOBI considers that this high proportion can be explained only on the supposition that many patients were dismissed as cured upon the first appearance of amendment, or before recovery had

been fully established. He states, that in the asylum under his management, only 40 cases completely recovered out of 100, and six were alleviated. M. Esquirol states, that of 5360 admissions into French hospitals, 2691 were cured; and in the *Memoirs of the Academy of Medicine* (vol. i. p. 40.) he observes, that 4968 were cured out of 12,592 admitted into the Salpêtrière and Bicêtre, many of whom were idiots, epileptics, and paralytic, and fatuous aged persons. The same writer assigns 5918 recoveries to 16,516 admissions into English lunatic asylums. From this it would appear, that the proportion of cures formerly obtained in English institutions for the insane is much less than that furnished by the French hospitals. Dr. Prichard remarks, that this is the more remarkable, considering the peculiar regulations of Bethlem and St. Luke's.—These hospitals present restrictions unknown elsewhere. They reject all who have been more than a year insane; also those affected by paralysis, epilepsy, or convulsions, idiots, the aged and the infirm, as well as those discharged uncured from other institutions; and all persons who have not recovered at the end of one year are dismissed. Yet, on comparing the reports of these hospitals with those of other institutions where no selection exists, the relative number of recoveries is not found to be so great as might be expected. Dr. Burrows states, on the authority of Stowe, who derived his information from Dr. Tyson, physician to Bethlem Hospital, that, "from 1684 to 1703, 1294 patients were admitted, of whom 890 were cured, which is a proportion of more than two in three. But from 1784 to 1794, 1664 patients were admitted, of whom 574, or rather more than one in three only recovered:—This is remarkable. Dr. Prichard gives, on the authority of Mr. Lawrence, the report of this institution from 1820 to 1833 inclusive; and from that it appears, that the total number of admissions were 2445, of whom 1124 were cured, 643 were discharged uncured, 70 at the request of friends, 385 as improper objects, and 99 died. Deducting the 385 subsequently excluded, the 2060 furnished 1124 cures, or considerably more than one half.

197. In the following hospitals, where no selection of cases is made, the proportion of cures is — 43 in 100 in the Stafford Asylum; 42 in 100 in the Wakefield County Asylum; 40 in 100 in the Lancaster County Asylum; and about 48 in 100 in the Gloucester Asylum. The following table, furnished to Dr. Prichard by Mr. Tuke, gives the admissions and the results in the Retreat near York, from 1812 to 1833 inclusive: —

Classes of Cases.	Number admitted.	Recovered.	Died.	Removed.	Removed improved.	Remain.
1. Cases of less than three months' duration -	63	51	8	1	2	1
2. Cases of more than three, and less than twelve, months' duration - - -	65	28	10	6	3	18
3. Cases of more than twelve months' duration - - -	101	31	15	17	4	34
4. Cases of relapse -	105	58	17	13	1	16
Total - -	334	168	50	37	10	69

Mr. Tuke states, that several cases, entered as recent, were properly old cases; and if these were excluded, together with those connected with diseases speedily terminating life, as consumption and apoplexy, the probability of recovery from insanity, in recent cases, is greater than nine to one. An able reviewer very justly remarks on this statement, which is strongly confirmatory of that long since made by Dr. Burrows, that it is deserving of attention, as the opinion generally entertained, in respect of cases even of recent date, is more unfavourable than ascertained facts should warrant; the desponding view taken of such cases evidently tending to relax the efforts which should be made for the recovery of them.

198. *C.* The *particular prognosis*, or *the symptoms especially indicating recovery* from insanity, requires a brief consideration. — *a.* A paroxysm of mania may continue a few hours, or days, or weeks, or longer, and then remit or entirely vanish; or it may assume the form of melancholia, and continue or alternate with mania to its termination. It is impossible to say when either form of insanity will subside: the more furious, however, the attack, the shorter, generally, will be its duration, especially in mania. But when a remission of violence is attended by amelioration of other symptoms, it is a favourable sign. If the malady have continued several weeks, and the system is suffering, the disease will prove obstinate, if not dangerous. Insanity terminates favourably more frequently by a visible decline of the symptoms, and a remission or complete intermission, than by critical discharges. To these last, M. Esquirol attaches too great importance, Dr. Burrows too little, in this disease; for, although alvine, hæmorrhagic, urinary, and suppurative discharges, or boils and cutaneous eruptions, do not certainly remove the mental disorder, even when taking place spontaneously, yet they frequently do remove it. Fevers, hydropic effusions, and gout,—particularly the last,—have also sometimes removed the mental affection. These, however, as well as other diseases, have more frequently been followed by a remission, or, at best, by an intermission only.

199. *b. Remissions*, when thus or otherwise observed, may continue for days, weeks, or longer; but the reason still continues partially deranged, and the sleep disturbed by dreams, or by unpleasant sensations, referrible to the head or senses of sight or hearing; and after a time the disorder resumes its full force. — *Intermissions* are a perfect restoration of the faculties for a time, varying in duration from two or three days, or a month, to several weeks, months, or even years. Sometimes the return of the attack is after regular intervals, or, *periodic*; but as often it is irregular. Insanity may cease after a time, having passed first into a remittent or an intermittent state; or it may disappear, more or less rapidly, and completely, without any return. A gradual and perfect restoration of the faculties, however, takes place in the great majority of cases of recovery, without any recurrence or exacerbation of symptoms constituting the states of disorder just mentioned.

200. *c.* The absence of false perceptions and delusions is a favourable circumstance; but when they continue after the abatement of physical violence, a protracted case may be anticipated. A return of the natural feelings, of the affections, particularly to near relatives, and to former habits,

is amongst the surest indications of recovery. But in all cases, in forming a prognosis, the mental phenomena should be viewed in connection with the physical symptoms and state of the patient, and with such changes in the economy as have usually been viewed as critical in acute maladies, and particularly those affecting the brain or its membranes, — especially the restoration of suppressed discharges, evacuations, and eruptions; or the spontaneous occurrence of these, — as the hæmorrhoidal and catamenial fluxes, epistaxis, diarrhœa, furunculi, a regular fit of gout, &c. The utmost caution, however, should be observed in giving an opinion as to the event; but it is preferable to hold out hopes of recovery as long as there is a chance of it, otherwise the efforts to effect it may relax, and the patient consequently suffer. The following inferences are not materially different from those arrived at by Dr. Burrows and M. Esquirol.

201. 1. A cure is probable in proportion to the youth of the patient.—2. It is also probable in a ratio with the recentness of the attack.—3. The chance of recovery is the greatest in first attacks, and diminishes with each subsequent attack, and with the duration of the disease and age of the patient.—4. Mania is cured most frequently; next, melancholia and monomania; and lastly, and the least, dementia and fatuity.—5. Melancholia is difficult of cure in proportion to the degree of depression; a dread of poverty, of poison, and perverted ideas of religion, indicating an obstinate disease.—6. Chronic insanity, whether mania or melancholia, seldom recovers.—7. The prognosis of puerperal mania is favourable.—8. Insanity with a propensity to suicide is not unfavourable, if the patient comes early under treatment, and the disease be recent.—9. Acute dementia is curable; but chronic demency and senile insanity are never entirely cured.—10. Hereditary predisposition protracts, somewhat diminishes the chances of, but does not prevent, a cure: relapses and recurrences are, however, more to be expected where it exists.—11. When the insane are capable of judging rightly of their own state, a cure becomes difficult.—12. An amendment of personal appearance, attended by an improvement in the mind, is indicative of recovery.—13. When the insane preserve or acquire all their physical functions, and eat and rest well, and present their usual appearance, without recovering their faculties, recovery is hopeless.—14. Insanity caused by excessive study, by the slow operation of moral emotions, or attended by hallucinations, by pride, &c., is seldom cured.—15. Complications with palsy, and apoplexy, are incurable, and are fatal ultimately: but those with epilepsy, or convulsions, may recover in very rare instances.—16. Men are more liable to relapses than women; one half of all relapses occurring in the first three months after recovery.

202. ii. Of Relapses and Recurrences of Insanity.—Recoveries from insanity are either *complete*, or *incomplete*. Of the latter, there are many, who, although perfectly rational, are never capable of returning to the sphere they formerly occupied, or of performing the duties which they previously fulfilled; their faculties having sustained a shock which can never be altogether recovered from. Dr. Prichard considers such cases to be about one tenth of the recoveries. Others remain longer or shorter in such a state of susceptibility that the slightest causes occasion *relapses;* and they preserve their sanity only by continuing to live where no mental agitation or inquietude is likely to befall them, and throw them back into their former state.

203. *a.* A *relapse* may be said to occur, when the malady returns, whilst the patient has scarcely, or very recently, recovered, or when he is only in a state of convalescence. It may take place a few weeks, or two or three months, after an attack of insanity. The precise time, Dr. Burrows remarks, when a cure may be said to be complete, is assigned with difficulty. Many experience, for weeks, even months, after recovery, uneasy sensations or confusion in the head; and, as long as these are complained of, no confidence can be placed in the stability of the cure. But when these sensations entirely cease, and all the functions are restored, any subsequent access of insanity is, as in other maladies, a *recurrence* of it, and no relapse.

204. Men are said to be less subject to relapses than women; but this is not the case, for numerous circumstances influence the chance of this event taking place, and to most of those men are more exposed than women. As soon as convalescence commences, the care of the physician and attendants is especially required; for, if imprudent measures be adopted before this period has been succeeded by restored health, a relapse will probably be thereby occasioned. The middle and poorer classes are more apt to relapse than the rich; for the former go from an asylum direct to their misery, and to encounter the exciting causes — probably the same causes which produced their derangement; whilst the latter may enjoy intermediate measures of precaution. Most of the relapses, as well as recurrences, of the disease, proceed from a premature or incautious gratification of habits and indulgences concerned in the production of the primary attack, or from too great mental exertion for the weakened state of the faculties, or from mental excitements or contrarieties.

205. *b.* The probability of a relapse is generally in a ratio with the suddenness of recovery, and is most frequent in mania. Recurrences are most common in melancholia; and, as well as relapses, are very apt to occur, when the mind is influenced by religious fears. Relapses or recurrences are announced by nearly the same symptoms as preceded the first seizure; and when warning has been taken by these, and medical aid procured, a return of the malady is frequently prevented. Indeed, it should always be remembered, that, when the mind has been once disordered, a predisposition is thereby created to a return of the malady when subjected to any of the exciting causes. In some constitutions, this predisposition or aptitude to a renewal of the complaint is much stronger, than in others; and to its greater strength in some persons, is partly to be attributed the remittent or intermittent character it frequently assumes; and the periodicity which it often observes, and which is probably owing to an increase of the predisposition by various physical influences recurring at stated periods. Each successive attack increases the morbid tendency to a return of the malady, and shortens the interval between it and that which is to follow; until, at length, the

intervals not only become much shorter, but also more imperfect; and the disorder at last assumes a remittent, or a permanent form.

206. *c.* The *proportion of cases* in which insanity is recurrent, has been generally overrated, in the opinion of Dr. PRICHARD. Of 444 recoveries, M. PINEL reckoned 71 cases of relapse and recurrence: but, of these 71 cases, 20 patients had experienced several attacks; 16 had left the hospital too soon; 10 came afterwards under treatment, and recovered without relapse; 14 had given themselves up to grief and intemperance; and several others were unfavourably circumstanced. M. ESQUIROL reports 292 recurrences of insanity out of 2804 recoveries, or a little more than one tenth. M. DESPORTES states, that 52 recurrent cases were recognised at the Bicêtre, in 1821, out of 311 admissions; or 17 in 100: and that 66 were received at the Salpêtrière, out of 454 admissions; or 15 in 100. M. GEORGET, however, remarks, that there were, amongst these cases of relapse and recurrence, many who had been discharged in a state of incomplete recovery, as well as a number of drunkards who came every year to spend some weeks in these hospitals, having been taken there in a state of intoxication.

207. Mr. HITCH has furnished Dr. PRICHARD with the particulars of 68 re-admissions, from among 546 admissions. These 68 re-admissions occurred in 25 persons only; and of these, there were 17 men, 10 of whom were paupers, re-admitted forty-nine times; and 8 women, of whom 4 were paupers, who were received nineteen times. Many of those who were re-admitted, had been either removed uncured by the wishes of friends, or discharged "relieved on trial," their friends having found it necessary to replace them: some returned after an apparently perfect cure. The general inference at which Dr. PRICHARD has arrived, is manifestly correct, that the improbability of a recurrence of insanity increases with the length of time which has elapsed without any sign of renewed disease; and that it is also greater in proportion to the completeness of the recovery. When the energy of the mental faculties is fully restored, relapse and recurrence are much less to be feared than when they remain weak and excitable.

208. iii. OF THE FATAL TERMINATION OF INSANITY. — Although the state of the brain connected with insanity may be incompatible with the due exercise of the mental manifestations, yet it may not so disturb the physical functions, as very materially to shorten or endanger life. This is shown both by the duration of insanity in many cases, and by the longevity of lunatics. Instances are adduced by M. DESPORTES and others, of the long continuance of this malady. Among the lunatics at Bicêtre, in 1822, 1 had been there fifty-six years; 3, upwards of forty years; 21, more than thirty years; 50, upwards of twenty years; 157, more than ten years. Among those in the Salpêtrière, there were 7 cases upwards of fifty years; 11, from fifty to sixty; and 17, from forty to fifty. Although many live thus long in a state of insanity, yet the mean duration of existence is shortened by it, and chiefly owing to the following causes, each of which requires a brief consideration:— 1. By exhaustion of organic, nervous, or vital energy; — 2. By the progress of the morbid state of the brain, associated with the mental disorder, so as seriously to disturb the physical functions; — 3. By favouring the development of diseases of several vital organs; — and, 4. By the occurrence of accidental disorders which may be masked by the mental disease, or concealed by it, until it assumes a serious form. The mental disorder, however, is often *symptomatic*, or sympathetic — a consequence of disease more or less latent, of some important abdominal or thoracic viscus, yet seriously affecting the constitution and nervous power; the physical malady being sometimes aggravated, and occasionally suspended for a time, by the sympathetic mental affection, but, nevertheless, terminating life sooner or later. This topic will be more particularly noticed hereafter.

209. *a. Exhaustion and depression of nervous or vital energy may proceed so far as to fatally terminate the insane state.* —This occurs chiefly in mania, wherein the inordinate excitement of the feelings, the constant agitation of both mind and body, the febrile disturbance of the system, and the continued want of rest and sleep, combine to exhaust the powers of life, and to occasion nervous depression and emaciation. In the majority of cases, the exhaustion either takes place gradually, or does not proceed so far as to endanger life; and the maniacal state passes either into recovery, or into dementia: sometimes, however, it is so extreme, or so complete, that the patient never afterwards rallies, but rapidly sinks to death. This occurs most frequently during the first two years from the commencement of the malady; and hence the greater number of deaths from mania, at this, than at any subsequent period. That this result should often follow, in cases where the excitement and general perturbation are great relatively to the amount of vital power, may be assumed *à priori*; and it is in these cases especially, that we find the organic lesions insufficient to account either for the mental disorder, or for the fatal termination. In extreme cases of melancholia, death may take place from depression, or sinking of nervous and cerebral power; and this state may be aggravated even to a fatal issue by a too depressing or exhausting method of cure, or from want of those means of restoration required by the peculiarities or exigencies of the case.

210. *b. The morbid state of the brain associated with the mental disorder may proceed so far as to seriously, and at last fatally, disturb the physical functions.* — In these cases, the lesions of the brain may vary remarkably in respect of seat, extent, and nature of parts implicated in them; and may commence gradually, and proceed slowly to fatal disorganisation, or may take place more or less suddenly, and terminate rapidly. In either case, we can observe only the ultimate and gross results in our examinations of the brain and its appendages after death; but there can be no doubt that these, during their development and increase, give rise to phenomena, several of which have been described when treating of the principal *complications* of insanity (§ 167. *et seq.*), — especially to the different forms of paralysis, to epilepsy and convulsions, to apoplexy, and to coma, either of which may terminate life.

211. *c. The development of serious diseases of vital organs seated in either the thoracic or the abdominal cavity, and even of the system generally, seems to be favoured by insanity;* and it is to these

diseases that a fatal termination is often owing. Many consider the occurrence of these diseases accidental; but they are so frequently observed among the insane, relatively to other classes of persons, that something more than chance is concerned in their production. As I believe that insanity — and particularly certain forms of it — is more or less connected with general debility of the organic nervous system, expressed more especially in the brain; so I consider that the functions, and subsequently the structure, of other important organs will suffer during the continuance of it, — particularly if any predisposition to disorder in these organs have already existed. And, accordingly, we find that those viscera most obnoxious to disease, especially in weakened states of vital energy, are the most frequently attacked. — *a*. Most writers and observing practitioners have remarked the great number of instances in which the death of insane persons was owing to *tubercular consumption* and inflammations of the pleura. In these cases, the pulmonary disease has generally proceeded in an insidious or latent form, until shortly before the fatal event has taken place. In many, insanity may be viewed as inducing a disposition to disease of the lungs, and as favouring the operation of its exciting causes, which may be more than usually influential and frequent in their operation during mental disorder. Dr. Greding found that 40 out of 100 maniacs, and 20 out of 25 melancholics, laboured under phthisis; and that 74 of 100 maniacs, and 20 out of 24 melancholics, were found to have more or less effusion, either in one or both cavities of the thorax. This may be an extreme frequency of these complications, or be owing to local or peculiar causes; but there can be no doubt of their frequency. Insane persons affected by these diseases of the lungs, lose their strength, suffer slow or hectic fever, become emaciated, and at last have cough and shortness of breathing, with diarrhœa. In this state the insane symptoms rather increase than abate, and generally continue until death. In some cases, the pulmonary disorder precedes the mental disorder, or accompanies it. This is especially the case with melancholia, as remarked by M. Esquirol, and with hypochondriacal monomania. In these, the impairment of vital power affects both the lungs and the functions of the brain, and sometimes both nearly simultaneously.

212. *β*. *Diseases of the heart* and great vessels are also often concerned in hastening a fatal issue of insanity. M. Foville states, that five out of six bodies display, upon examination after death, some organic disease of the heart and great vessels, — particularly hypertrophy of the heart. This is most probably owing, in part, as he supposes, to the violent efforts and agitation of insane patients.

213. *γ*. Although *diseases of the digestive organs* frequently exist previously to the appearance of insanity, and are often more or less concerned in causing it, yet they often do not become objects of attention until after it has fully declared itself; when, from their nature or severity, they obtrude themselves upon the notice. Whether the disorder consist of gastro-intestinal irritation or not, at the commencement, it frequently passes into it; and, at last, terminates in ulceration, originating chiefly in the mucous follicles, or in abrasion of portions of the mucous membrane. At the beginning of the mental disorder, and particularly of melancholia and mania, constipation is both obstinate and of long continuance; the most drastic or active medicines being required to act upon the bowels. But it generally at last gives way, and is followed by, or alternates with, diarrhœa, which sometimes passes into dysentery, and which rapidly exhausts the strength of the patient, without abating the mental disorder.

214. *δ*. The *cachexia* already noticed, frequently associates itself with other maladies, in causing a fatal termination of insanity, and particularly with disease of the alimentary canal, and enlargement, obstruction, torpor, and congestion of the *liver*, and even also of the *spleen*. In many cases, this state of cachexia is evinced by a sallow, lurid, dirty, and scaly state of the skin; and by papular eruptions or discoloured patches. It sometimes proceeds to more obvious disease of the fluids and soft solids; furunculi and carbuncles break out in different parts of the body, and sometimes slough extensively; the gums become spongy and sore, and bleed upon the slightest irritation; livid blotches occasionally appear on the lower extremities; and complete scurvy at last supervenes. In other cases, emaciation, occasionally amounting to marasmus, a cold and clammy state of the general surface, diarrhœa, and colicky pains in the abdomen, take place, either with or without the more obvious indications of scurvy; and the patient sinks from the gradual decay of vital power, and the effects of this decay upon the digestive, the assimilative, and nutritive functions. These cases are most frequently met with in dementia and chronic mania, — the mental faculties indicating a failure of the vital manifestations of the brain, altogether similar to that of the other important organs of the body.

215. *d. There are other maladies of more accidental occurrence, which often terminate the life of the lunatic.* — These, as well as the most of those just noticed, may be masked by the mental disease, or entirely concealed by it, until they reach a serious or even dangerous form, or they may not be detected until disclosed by a *post mortem* examination. The complaints of the patient even are often overlooked and taken for delusions. This is especially the case in hypochondriacal monomania, and melancholia. But the truly observing physician will frequently recognise, in the delusions of the insane, bodily disease of a serious nature. Several of the delusions already noticed, have been shown to depend upon contingent organic lesion of a vital or important organ. Sufficient proofs of the truth of this have been adduced above (§ 21.); and I need not further allude to this topic, than to press the importance of this connection, and the necessity for carefully ascertaining what connection may exist between the illusion entertained and visceral lesion. Many of the diseases which may be viewed as accidental only as respects their occurrence in lunatics, may, in some degree, be owing to the physical state of these individuals; inasmuch as they are more frequently attacked by these diseases, and suffer more severely from them than any other class of persons. — Fevers and chronic inflammations are often met with among them; the former generally assuming a typhoid character with predominant cerebral affection, and frequently terminating fatally; the latter often giving rise to effusion, and causing death in consequence.

216. *e.* The *diagnosis of visceral diseases in lunatics* is remarkably difficult, owing either to the unfounded complaints made by them under the influence of fancied and erroneous sensations, or to the extent to which the mental disorder masks the physical disturbance. Many lunatics labour under severe diseases, without evincing them by any expression — because either these diseases do not occasion much suffering, or the disturbed state of their minds prevents the morbid sensation from being perceived. In this latter respect, the diseases of lunatics are more obscure than those of infants, because the latter express their ailments by their cries and attitudes. M. GEORGET justly remarks, that, where we observe a lunatic, who had previously been agitated and furious, become morose and taciturn, and at the same time lose his appetite, seek repose, and display a suffering and dejected expression, we ought to examine him carefully, for he is attacked with acute disease. The development of symptoms will soon point out the seat and nature of the malady. But chronic affections are so slow in their approach, and so latent in respect of their symptoms, that they often reach a very advanced stage before their existence is suspected, unless a careful examination had been made before, as well as after, their commencement. This is especially the case in regard of diseases of the lungs, heart, pleura, and of the organs of digestion. From this it is manifest that insane persons should be carefully watched and examined, and that the states of the lungs and heart should be investigated from time to time by percussion and auscultation.

217. *f.* The *rates of mortality* among lunatics have received much attention from M. ESQUIROL and Mr. FARR; the former of whom states, that the highest rate, for the two sexes, is between the ages of 40 and 50: that of women is greatest between 50 and 60; that of men between 40 and 50. A greater number of men than women die insane; and this is partly owing to the greater frequency of the more dangerous complications in the former than in the latter. M. ESQUIROL concludes, from a comparison of different hospitals, the deaths to be — in *mania*, 1 in 25; in *monomania*, 1 in 16; in *melancholia*, 1 in 12; and in *dementia*, 1 in 3. He further states, that a greater number of deaths take place in December, January, and February, than in any other three months. Mr. FARR states, that the mortality furnished by Bethlem, St. Luke's, and the Asylums at Stafford, York, Lincoln, Gloucester, and Hanwell, amounted to 10·40 out of 100 treated; that the annual mortality among lunatics was 9 per cent.; and that the mean ages of those admitted at Bethlem varied from 36 to 39. That no precise idea can be formed, however, from these data, of the mortality of the insane, is evident from the fact, that two of the principal of these institutions do not admit any but recent cases, and that they do not allow these cases to remain longer than one year. Enough, notwithstanding, is adduced to prove that *insanity remarkably shortens the mean duration of life.*

218. Considerable difference exists in estimates formed by writers of the numbers of deaths from the prevailing diseases among lunatics. Indeed, no precise data can be furnished on this point; for those who parade numerical data or details in this, as well as in other maladies, by no means satisfy us in what manner those details have been obtained. Numerical results, unless furnished by the ablest and most discriminating observers, and with the utmost accuracy and good faith, may mislead more than instruct: and this is a subject on which it is next to impossible to furnish them with precision. Besides, the comparative prevalence of fatal diseases in lunatics will necessarily vary in different places, with numerous related circumstances and contingencies. The diseases, also, of the insane are often so complicated, that different observers may impute the fatal result to different affections or lesions even in the same cases, although the matter may seem to have been placed beyond dispute by a *post mortem* examination. Thus, tubercular formations in the lungs and extensive ulcerations in the bowels will often be found in the same case; or disease of the liver, lesions in the brain, and inflammation of the peritoneum, or of the pleura, in another; or changes in the heart, effusions into the cavities, and lesions of some other organ, in a third: and hence different physicians may ascribe death to very distinct organic changes. Some, even, satisfied with the alterations presented by one vital organ, may leave other important viscera either entirely unexplored, or insufficiently investigated, although they may be equally, or even more, affected.

219. Notwithstanding these objections, it may be conceded that the most fatal maladies among the insane occur nearly in the following order as to frequency: — More or less sudden deaths from apoplexy, coma, and convulsions; — pulmonary and pleuritic lesions; — nervous, typhoid, adynamic, and putro-adynamic fevers, usually with predominant affection of the brain; — general palsy; — general cachexia, frequently with colliquative diarrhœa; — organic lesions of the liver, bowels, and mesenteric glands, causing marasmus, &c.; — exhaustion of vital power without sufficient alteration of structure to account for death; — structural change of the heart, &c.; and dropsical effusions into shut cavities, particularly the pleural and pericardiac; — mortification, chiefly of parts pressed upon, and of the extremities; — organic changes in the stomach and pylorus; — chronic peritonitis, generally latent; — alterations of the uterus, spleen, and pancreas, &c. Organic lesions of the brain, lungs, heart, and digestive organs are found variously associated, in most cases, upon examination after death; those of one organ predominating over the rest in different cases, and seldom presenting a due relation to the symptoms or disorders complained of, or manifested during life. Diseases in the abdominal organs, and particularly in the intestinal mucous surface, are amongst the most frequent morbid associations of insanity, but generally contingent upon it, and not until an advanced period of its progress; although, as will appear in the sequel, they are also important physical causes of it. M. ESQUIROL observes, that of upwards of 600 examinations after death, three eighths die of diseases of the abdomen, two eighths of diseases of the chest, and three-eighths of alterations of the brain and membranes. The proportion here assigned to the first class of diseases is probably too high, and especially in respect of this country. A very able writer remarks, that the reports of lunatic asylums partly show, that the corporeal ailments, under which the patients languish and die, are very often overlooked, and are

consequently not met by proper treatment; and that these establishments are made a kind of show-houses, instead of being hospitals for the complicated diseases which involve the functions of the mind. " We grant," he goes on to state, " that the mental malady may often be but the first sign of that total impairment of the frame which phthisis, or hydrothorax, or scorbutus, or paralysis, or marasmus afterwards more plainly declare; but we suspect there are cases in which, if the life of the patient were preserved through some of the maladies supervening on the mental disorder, the mind would be found to be restored, and the malady to be critical. With the present management of lunatic hospitals, these conjectures can neither be verified nor refuted. In many of them, medical aid is considered to be nearly superfluous; and in some, we are informed that the appointment of physicians in ordinary has been, if not rejected by the governors, at least, subjected to grave debate, as if the County Asylum were no more than a supplementary county jail." (*Brit. and For. Med. Rev.* No. xiii. p. 30.).

220. M. Esquirol gives the following tables of the mortality in insanity, according to the ages :—

	Bicêtre. No. of *Men* admitted from 1784 to 1794, 2405.	Salpêtrière. No. of *Women* admitted from 1804 to 1814, 2804.
20 to 30	25	58
30 to 40	176	83
40 to 50	215	143
50 to 60	134	173
60 to 70	90	123
70 and upwards	45	210
	685	790

Table of the Mortality at the Sâlpetrière during 10 Years.

No. admitted each Year.	1804	1805	1806	1807	1808	1809	1810	1811	1812	1813	Total.
271	46	21	15	8	1	6	2	1	1	1	102
301	—	48	29	16	7	2	4	1	—	2	109
292	—	—	49	22	9	2	1	4	2	1	90
297	—	—	—	64	25	3	2	2	4	1	101
252	—	—	—	—	35	23	8	1	3	1	71
299	—	—	—	—	—	35	31	7	3	1	81
260	—	—	—	—	—	—	30	22	9	3	64
233	—	—	—	—	—	—	—	26	20	9	55
301	—	—	—	—	—	—	—	—	23	10	33
298	—	—	—	—	—	—	—	—	—	26	26
2804											738
Deaths during this period amongst those admitted before 1804											52
											790

Of 790 deaths at the Salpêtrière, from 1804 to 1814, 382 occurred in the first year after admission, 227 in the second, and 181 in the seven following years.

221. The table of deaths from insanity, and from the diseases of the brain most nearly allied to insanity (p. 475.), is made up from the "*Abstracts of the Causes of Deaths registered in England and Wales, from* 1st *of July to* 31st *of December*, 1837, *both inclusive*." These abstracts, and the remarks accompanying them, by Mr. Farr, are extremely valuable to medical men. It is to be hoped, that the reports of the register-general will appear annually. Mr. Farr states, that the insane, who die in lunatic asylums, have often been registered improperly under secondary diseases, such as apoplexy and diarrhœa. Under the head of violent deaths are included suicides, accidents, &c.; and it cannot be doubted, that the great majority, at least, if not the whole, of suicides, are instances of some form or grade or other of insanity.

222. V. Of the Alterations of Structure connected with Insanity. — It is evident, even from what I have already stated, that few diseases are connected with so great a diversity of structural changes as insanity; and there is none which has given rise to so much discussion and difference of opinion as to the nature of this connection, as it has occasioned. It has even attached to itself a very particular interest at present, owing partly to its importance, and partly to the very opposite views entertained respecting it by some of the most experienced of recent writers on mental diseases. — But little information was furnished on this subject previously to the almost contemporaneous publication of some cases, with the *post mortem* appearances, by Morgagni and Meckel. — Ballonius, and long afterwards Bonet, had furnished a few particulars; but these were rather of lesions found in the thorax and abdomen, than of changes within the head; and it was not until the investigations of Greding, Marshall, and Haslam appeared, that the appearances of the brain in fatal cases of insanity received any degree of attention. More recently, the researches of Pinel, Esquirol, Georget, Bayle, Lallemand, Bouillaud, Neumann, Guislain, Calmeil, and Foville, have been most assiduously directed to this interesting subject; still the results furnished by them are of such a kind as to prove the necessity for further investigation, carried on independently of preconceived opinions. Although British writers have hitherto contributed but little to this department of medical knowledge, it is to be hoped that those who have the management of public institutions for insanity in their hands, will see the advantages which will result contingently even to those connected with themselves, — will catch a glance of their own interests prospectively, — from the encouragement of researches into the pathology and treatment of the most distressing of all maladies, not merely for the benefit of the few subjects of the maladies to whom they are guardians for a time, but also for the instruction of those to whom the community have to look for aid in these calamities, and, consequently, for the advantage of all classes in society.

223. i. Morbid Appearances observed in the Head. — *A*. The *cranium* seldom presents any change from the healthy *shape*, excepting in epileptic or idiotic lunatics. Greding states, that of 220, only 16 had the forehead contracted, the temples compressed, and the occiput large and expanded. In a few, the head was elongated and compressed laterally. In some, the head was almost round, or of a square shape: these were chiefly epileptic lunatics and idiots. I have observed, in this class, one side of the head higher than the other, and sometimes also more prominent, whilst the other side receded, giving rise to the *diamond-formed obliquity* or deformity of the skull described by me in the article Cranium (§ 9.). Of 26 cases, including epileptic lunatics and idiots, Greding observed 2 belonging to these latter, with very small and quite circular heads. Of the whole number of cases (220), the skull was unusually thick in 167: this was

TABLE OF DEATHS FROM INSANITY, AND FROM DISEASES MOST NEARLY ALLIED TO IT, IN ENGLAND AND WALES, *from 1st of July to 31st of December, 1837, inclusive.*

NAMES OF PLACES.	AREA, in Acres.	POPULATION according to the Census of 1831.	INSANITY.			DELIRIUM TREMENS.			CEPHALITIS.			PARALYSIS.			APOPLEXY.			EPILEPSY.			DISEASE of the BRAIN.		
			Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
The Metropolis, and parts of Middlesex, Surrey, and Kent - - - - - - - - -	44,810	1,594,890	38	39	77	30	4	34	159	135	294	161	176	337	259	230	489	64	43	107	91	71	162
Manchester and Salford - - - - -	37,797	236,935	1	1	2	0	0	0	9	14	23	23	17	40	25	6	31	3	4	7	10	8	18
Liverpool and West Derby - - - -	38,060	218,233	8	1	9	0	0	0	7	6	13	22	13	35	34	17	51	6	7	13	2	5	7
Leeds - - - - - - - -	41,520	135,581	1	0	1	1	0	1	11	9	20	1	7	8	13	10	23	0	1	1	16	9	25
Birmingham - - - - - - -	2,660	110,914	5	5	10	1	0	1	5	3	8	8	13	21	14	11	25	4	2	6	5	5	10
Part of Middlesex, Hertfordshire, Buckinghamshire, and Bedfordshire - - - - - -	1,323,888	515,893	9	4	13	4	1	5	21	18	39	28	27	55	60	61	121	11	19	30	8	17	25
Kent, part of Surrey, Sussex, Hampshire, and Berkshire - - - - - - - -	3,861,100	1,351,236	16	14	30	9	0	9	53	37	90	95	107	202	188	168	356	30	32	62	66	35	101
Dorsetshire and Wiltshire - - - - - -	1,407,913	373,797	3	3	6	2	0	2	10	6	16	42	44	86	33	37	70	9	12	21	5	3	8
Devonshire - - - - - - - -	1,691,572	503,118	3	2	5	4	0	4	21	11	32	39	32	71	61	64	125	12	8	20	14	12	26
Cornwall - - - - - - - -	866,474	304,785	1	1	2	0	0	0	8	5	13	18	30	48	25	30	55	1	6	7	4	4	8
Somersetshire - - - - - - - -	987,087	451,252	5	2	7	3	0	3	17	14	31	22	27	49	42	29	71	8	6	14	17	11	28
Essex - - - - - - - - -	928,589	304,315	0	6	6	2	0	2	12	9	21	18	17	35	32	35	67	8	11	19	8	5	13
Norfolk and Suffolk - . - - - - -	2,118,867	682,788	7	15	22	2	0	2	21	15	36	39	63	102	58	59	117	11	9	20	11	14	25
Cambridgeshire, Huntingdonshire, and South Lincolnshire - - - - - - - - -	1,295,379	311,714	0	0	0	2	0	2	7	8	15	22	13	35	24	22	46	4	9	13	5	7	12
North Lincolnshire, Rutlandshire, Derbyshire, Nottinghamshire, Leicestershire, and Northamptonshire	3,936,980	1,045,133	5	7	12	5	0	5	18	27	45	65	78	143	96	72	168	20	21	41	33	26	59
Oxfordshire, Gloucestershire, Worcestershire (except Dudley), and Warwickshire (except Birmingham) -	2,355,462	977,108	13	8	21	4	0	4	41	33	74	63	83	146	104	87	191	12	21	33	50	32	82
Mining parts of Shropshire, Worcestershire, and Staffordshire - - - - - - - -	140,798	223,457	2	1	3	0	0	0	9	7	16	9	11	20	11	21	32	3	2	5	5	4	9
Cheshire, Shropshire, and Staffordshire (except mining districts) - - - - - - - -	2,216,515	721,555	8	12	20	3	3	6	26	11	37	45	51	96	64	60	124	13	19	32	14	14	28
Lancashire (except Liverpool and Manchester), south of Morecambe Bay - - - - - -	1,131,270	905,501	9	6	15	1	0	1	36	22	58	58	50	108	69	44	113	15	14	29	10	6	16
West Riding of Yorkshire (except the northern part thereof, and Leeds) - - - - - -	1,250,530	773,254	4	4	8	4	0	4	26	27	53	33	21	54	40	42	82	12	9	21	18	10	28
City of York, and East Riding of Yorkshire - -	730,945	199,515	0	2	2	2	0	2	8	4	12	10	13	23	34	28	62	9	12	21	5	3	8
Durham, and the North Riding of Yorkshire, with the remainder of the West Riding (except the mining part) - - - - - - - - -	2,104,736	319,042	1	2	3	4	0	4	12	8	20	23	31	54	41	36	77	7	4	11	9	10	19
The mining parts of Northumberland and Durham -	88,708	318,941	1	2	3	0	0	0	20	12	32	57	34	91	40	30	70	0	1	1	10	5	15
Cumberland and Westmoreland, with the remainder of Lancaster and Northumberland - - -	1,590,448	338,273	1	0	1	0	0	0	13	7	20	33	22	55	21	26	47	3	4	7	8	7	15
Wales, Monmouthshire, and Herefordshire - -	- - - -	1,016,219	6	1	7	3	1	4	7	6	13	73	72	145	60	39	99	13	16	29	14	3	17
England and Wales - - - - - -	Area in Sq. Miles. 57,805	13,897,187	147	138	285	86	9	95	567	454	1021	987	1052	2039	1447	1264	2711	278	292	570	438	326	764

observed in 78 out of 100 cases of mania, and in 22 out of 30 idiots. In some cases, the cranium was remarkably thin. Numerous foramina were observed in the inner table of 115 out of 216 cases; and, in some instances, bony projections arose from this table. Similar changes in the cranial bones were noticed by NEUMANN and GEORGET, — the latter of whom has inferred hypertrophy of these bones to be still more frequent in lunatics than stated by GREDING. The bones of the head have likewise been observed more vascular than natural by CALMEIL and others. (See art. CRANIUM, § 9—12.)

224. *B.* The *membranes of the brain* are frequently altered. — *a.* GREDING found the *dura mater* adherent to the cranium in 107 out of 216 cases; in a few instances, of a bluish black colour, thickened, and containing ossific deposits. Similar lesions were observed by M. GEORGET, who also detected the *arachnoid* sometimes thickened, but smooth, and occasionally presenting, in places, additional lamina of a red or grey colour. The *pia mater* was, according to this pathologist, injected, thickened, and infiltrated with serum, giving it at first the appearance of a gelatinous deposit. GREDING found it thickened and opaque in 86 out of 100 cases of mania, and beset with small spongy bodies in 92 out of 100; these bodies being united to the surface of the brain, and in some instances containing ossific matter. M. CALMEIL has described these excrescences, granulations, or spongy bodies, to arise or grow from the pia mater so as sometimes to penetrate the dura mater and cause absorption of the inner bony surface of the cranium: and he has remarked, that infiltrations and thickenings of parts are almost constantly found under these excrescences. The above changes in the membranes, and particularly in the arachnoid, have been recorded also by HASLAM, by GUISLAIN, and by M. BAYLE. To these alterations, and to effusion of serum between the membranes and in the ventricles, this latter physician ascribes the chief phenomena characterising and contingent upon insanity.

225. *b. Effusions of serum* between the dura and pia mater were observed by GREDING in 120 out of 216 cases of insanity, and in 58 out of 100 maniacs; and between the pia mater and surface of the brain, in 28 out of 100 cases of mania. The lateral ventricles were full of serum in 29 instances, and remarkably distended in 23. They were equally distended in 10 amongst 24 cases of melancholia. The third ventricle was quite full in 57 out of 100 maniacs, and in 16 out of 24 melancholics. The fourth ventricle was distended to the utmost in 80 out of 100 maniacs, and quite empty only in 3. It was greatly distended in every one of 24 melancholics examined. Dr. HASLAM found serum effused between the membranes in 16, and in the lateral ventricles in 18, out of 37 cases. Effusions between the membranes and in the ventricles were met with also by MM. GEORGET, GUISLAIN, and BAYLE, — the last of whom ascribes insanity to inflammatory irritation of the membranes; effusion following upon the inflammation, in his opinion, and occasioning the cessation or diminution of maniacal violence, the great loss of power in the intellectual faculties, and the commencement of general paralysis, owing to the pressure caused by the effusion. According to this view, the progress of dementia, fatuity, and general paralysis indicates a corresponding increase of effusion and of pressure on the brain. Other writers, who differ from M. BAYLE as to the origin and seat of insanity and general paralysis in chronic inflammation of the membranes, and of serous effusion from them, readily admit the great frequency of these lesions. LALLEMAND, CALMEIL, BOUILLAUD, CASAUVIEILH, and FOVILLE have all described similar changes to the above; but have viewed them more in connection with alterations in other parts, and estimated them differently.

226. *c.* The *choroid plexus* was found in a healthy state by GREDING in 16 cases only out of 216, and thickened and full of hydatids in 96 out of 100 maniacs. M. GEORGET has remarked that the choroid plexus was exsanguineous, and contained hydatidiform vesicles.—The *lateral ventricles* were in some instances very small; but, much more frequently, large, and distended, as just stated, with serum, which was remarkably clear and limpid. — The *convolutions* of the brain were often observed, by M. GEORGET, separated by an effusion of serum, and the pia mater thickened.

227. *d.* M. FOVILLE states, that, in acute cases, the morbid appearances discovered in the meninges were chiefly injection of the pia mater; and that this injection was generally proportioned to the degree of inflammation existing in the cortical substance of the convolutions. The small arteries and veins passing from the membrane and penetrating the grey matter were distended with blood: the arachnoid, in these cases, generally retains its natural aspect. The chronic changes in the membranes, according to this observer, consist for the most part in opacity, increased consistence, thickness of the arachnoid, the formation of granulations and false membranes on its surface, and the effusion of serum into the cellular tissue of the pia mater and into the ventricles. The arachnoid is often, in patches or more extensively, of a pearly whiteness. The opacity of this membrane is always attended by thickening; and in the place where the arachnoid and pia mater are naturally contiguous, they are found to be adherent. The opaque patches result from the deposition of albumen upon the arachnoid.

228. *C.* The *substance of the brain* has been more closely examined in cases of insanity, in recent times, than heretofore. Indeed, the progress that has lately been made in the minute anatomy of this organ, will necessarily enable the pathologist to recognise many lesions of its structure, which were entirely overlooked in former times. The researches of M. FOVILLE into the state of the brain in persons who have died insane, are of great importance, and were carried on by him in the Sâlpetrière, aided by MM. DELAYE and PINEL GRANDCHAMP, and subsequently in the extensive hospital of St. Yon, near Rouen, which is under his care. The morbid appearances which I proceed to describe, as having been observed in the brain, are chiefly the results of his investigations.

229. *a.* The *grey substance of the brain* presents, in the most acute cases, on the removal of the membranes, intense redness of its surface, approaching to that of erysipelas. This is still more marked in the substance of the cineritious tissue itself; and it is more striking in the frontal region, than in the temporal and lateral lobes,—and in the higher regions, than in the posterior parts. — In *acute cases* of insanity, M. FOVILLE states that

the changes in the grey matter consist of uniform and intense redness of colour, with numerous mottled spots, varying from a bright to a violet red, and bloody points or minute extravasations of blood; of diminished consistence of this structure, coincident mostly with a slightly increased consistence of its surface; and of dilatation or enlargement of its vessels. He has never observed, in these acute cases, adhesions of the membranes to the cortical substance, which are very frequent in chronic cases. To this circumstance he ascribes the curability of recent cases, and the incurability of dementia, and chronic cases.

230. In these latter cases, the grey or cortical substance becomes much firmer, and dense, in the superficial part; and this part, owing to its uniformity, constitutes a distinct lamina, smooth externally, but irregular internally; of a lighter colour than usual; and admitting of being torn or peeled off, leaving the remainder of the grey substance red, soft, and mammillated. Sometimes this pale and dense surface, or part of the cortical substance, is rough and granulated, containing small grains of a yellowish white. In conjunction with these, the volume of the convolutions remains natural, or is lessened or atrophied. When it is the latter, linear depressions or irregular pittings exist on the surface of the convolutions; and in the grey substance itself, small yellowish lacunæ, filled with a yellowish serum, are found. These lacunæ are supposed to correspond with, or to be the remains of, the minute extravasations observed in acute cases. In other instances, the diminution of volume is a real atrophy of the convolutions, which appear thin and angular, as if pinched up towards their extremities. This change is very frequent in the frontal regions of the hemispheres, and often particularly comprises three or four convolutions in each side of the sagittal suture, — a chasm, filled with serum, occupying the place left by the absorbed substance. Coexistent with this alteration, is often observed a limited atrophy of the cranium, or a circumscribed disappearance of the diploë, owing to which the external table approaches the inner, leaving a superficial depression. In this atrophy of the convolutions, the diminution of substance is confined frequently to the cortical or grey matter; what remains of it being harder than natural, and sometimes presenting, on close examination, a fibrous structure. It is also of a darker colour, and occasionally seems separable into layers, — the exterior being pale, and the interior of a rose colour.

231. Softening of the grey substance is also often observed, in chronic cases of insanity, extending through its whole thickness, and not superficial merely. This softening is generally attended by a greater depth of colour, which often approaches to brown, and is frequently so great as to amount almost to liquefaction of this structure. This extreme and general softening of the cortical substance is not necessarily attended by a similar change of the white structure; but is sometimes conjoined with a hardened state of that structure. In these cases, the grey may be separated from the white substance by the effusion of water. These more extreme alterations are found, especially in the worst cases of dementia, complicated with paralysis and marasmus. MM. Foville and Calmeil have met with instances of this description, in which limited portions of the grey substance had disappeared previously to death. The grey structure in other parts of the brain does not present the same changes as have now been described as taking place in the convolutions; but generally exhibits alterations similar to those of the medullary or white substance. The cortical structure, however, of the cornu ammonis is in some cases softened, and in others hardened.

232. *b.* The *white or fibrous structure of the brain* is often found altered in colour, density, and texture. It is frequently injected, and its vessels more or less enlarged, exhibiting numerous bloody points on sections of it. In other cases, it has a mottled appearance, of a deep red or violet hue, owing, as M. Foville believes, to a finer injection of its vessels, as shown by the magnifying glass. These injections of the white structure do not always coincide with similar injections of the grey substance. Sometimes the fibrous or white structure is splendidly white; and generally at the same time increased in density, or hardened. This induration occasionally amounts to an almost fibro-cartilaginous state. In two or three cases, I have observed the increase of density nearly to resemble the white kind of caoutchouc. The hardened fibrous structure, however, may not be remarkably white; it is sometimes of a yellowish, or of a greyish or leaden, tinge. M. Foville accounts for the induration of this structure, by supposing that the cerebral fibres have contracted adhesions to each other, so as to render their separation impossible. According to him, the fibrous mass of the hemispheres consists of several distinct layers or planes of fibres applied one upon the other, and connected by very fine cellular tissue. These planes are easily separable in the healthy state, but become inseparable in the course of mania. The occurrence of tubercles and tumours in the brain is considered by him as accidental, when met with in cases of insanity.

233. *c.* The *cerebellum* undergoes alterations similar to those observed in the brain, but much more rarely.

234. *d.* The *nerves* sometimes present changes corresponding with disorders of sensation and perception. M. Foville has found the optic nerves hardened, and otherwise altered, in persons troubled with hallucinations of sight.

235. *e.* The *morbid appearances found in cases of insanity complicated with general paralysis* have especially engaged the attention of M. Calmeil. In this association of mental and of physical disease, it is very difficult to determine, as Dr. Prichard remarks, what alterations are connected with either morbid state; and certainly many of the changes met with by M. Calmeil, in these paralytic cases, are similar to those regarded by various writers as connected with insanity, without reference to its association with paralysis. This pathologist concludes that general paralysis is not dependent upon compression of the brain by serous effusion, as supposed by M. Bayle, but upon the disease of the encephalon which gives rise to the effusion, and chiefly on inflammation, of which the thickenings, and lesions, and vascular turgescence of the pia mater, and the peculiar condition of the grey structure, afford sufficient evidence. M. Calmeil has succinctly enumerated the changes observed by him in the encephalon, in this class of complicated cases, nearly as follows: — Injection and absorption of the bony structure; injections of the

dura mater, separation of its fibres; effusion of serum into the cavity of the arachnoid; false membranes, organised or without organisation; cysts filled with blood in its two laminæ; simple hæmorrhages in the arachnoid; œdema of the meninges; injections and thickenings of the membranes; vegetations of the pia mater, and development of its vessels; adhesions between the pia mater and the convolutions; disappearance of the grey substance; softening, induration, and discolouration of this substance; hardening and injection of the white or fibrous structure; redness and tumefaction of the ventricular villosities; serous effusion into the ventricles; apoplectic cysts; erosions of the convolutions; softening of the brain, or of the spinal marrow. These changes are so various, and so far from uniform in occurrence, that they cannot satisfactorily explain the results imputed to them. M. Calmeil considers them all to be proofs of a chronic inflammation of the brain; and in this, as well as in his descriptions of many of the alterations, he agrees with M. Foville. This latter writer states that, in lunatics affected with general paralysis, he found the induration of the fibrous structure of the hemispheresd escribed above (§ 232.), wanting only in two cases, and in these the cerebral nerves, the annular protuberance, and the medulla oblongata presented extreme hardness. He states further, that this induration of the fibrous structure of the brain has been found in old men, whose voluntary movements have become uncertain or vacillating; but it has never been seen in lunatics whose muscular powers had remained unimpaired. I have observed induration of the spinal cord, with effusion of serum between the membranes, and other changes, in two cases of general incomplete paralysis unattended by insanity; both patients, however, having become delirious shortly before death.

236. The brain has occasionally been so infiltrated with serum, that the fluid has flowed from the surface of the incisions. This infiltration has been so remarkable in a few instances, as to constitute a true œdema of the brain. Much more rarely, as observed both by Esquirol and by myself, a multitude of pores or small cavities, containing a limpid serum, have been found in the substance of the brain; a section of the part thus changed resembling that of a porous cheese. In these cases, the brain may be also somewhat indurated and changed in colour. It is by no means determined, as some suppose, that these pores or cavities are the sequelæ of vascular extravasations. It is more probable that they are the consequences of softening; the pores being left by the removal of the molecules of the cerebral substance, which have lost their vital cohesion to the rest of the structure, and filled by a serous effusion.

237. *f.* The *inferences which may be drawn from these researches* deserve a brief notice. It will be seen from these, that M. Foville ascribes the morbid appearances to inflammation; and, in this, agrees with Calmeil and others. But it will be remarked by many, and not the less by those who may have read the article Inflammation in this work, that this term has been applied, and possibly is applicable, to several lesions, attended by changes in the state of capillary and vascular action, each differing more or less from the other, and accompanied with different, or even opposite, conditions of organic nervous or vital power; and that, although these lesions may be apparently quite similar, and be followed by nearly the same results, in different cases or persons, yet may the state of vital power or manifestation, in respect not only of the functions of the brain, but also of the whole economy, differ remarkably in each particular instance. It is well known that the lesions constituting, as well as consequent upon, several kinds of phlegmasiæ — upon phlogosis, or simple sthenic inflammation, and upon erysipelas and other forms of spreading or asthenic phlegmasia — nearly resemble each other; but they are attended by very different constitutional disorder; and this is independently of grades of activity or intensity of action. Besides, something should be attributed, in many cases, to the influence of the moral causes, and to the consequent mental excitement, upon the cerebral circulation, with reference not only to prolonged erethism or excitement of the capillaries distributed to the organ of mind, but also to constitutional or vital power, and to the various maladies of which the cerebral affection may be only a symptom, or sympathetic disorder. We know that, in other organs or parts, a prolonged irritation or excitement of their capillaries, by agents which excite chiefly the nerves supplying them, will so determine the blood to them, and so enlarge and develop their vessels, as to give rise to appearances which nearly resemble the consequences of inflammation. We find, moreover, that the most violent forms of mania and of delirium, and the most fatal when not judiciously treated, are actually those in which inflammatory appearances are the least evinced, or in which states opposite to inflammatory really exist. We find, also, lesions in the brain — whether inflammatory or not — equally extensive with those observed in the most general and complicated cases of insanity, and without any disorder of mind having existed during life. Can we, therefore, legitimately impute insanity, in all cases, to these lesions? or may not these lesions be just as legitimately imputed to the insanity? There is very probably a connection between them, in most cases; but neither the exact nature of the connection, nor the intimate relations and source of the morbid alterations observed, have been yet fully ascertained. This is, however, no reason wherefore we should altogether reject the conclusions at which able and experienced observers have arrived, until we obtain others upon which more implicit reliance can be placed.

238. The morbid changes in the encephalon, M. Foville infers to be the results of inflammation: intense, diffused, and general redness; in many cases, tumefaction; and, in passing to the chronic state, the formation of adhesions between the cortical substance of the convolutions and the contiguous membrane: besides this, adhesion of the different planes, or layers of the cerebral substance, to each other, in a certain number of cases. As the different traces of inflammation are more constant in the brain than in the membranes, M. Foville concludes that the essential change connected with insanity takes place in the brain, and that alterations of the membranes are only accidentally connected with it. Amongst the morbid appearances in the brain, lesions of the grey structure are considered by him as the most constant in connection with the mental disorder. Although M. Calmeil was inclined to ascribe loss of mus-

cular power to disease of this structure, M. Foville contends that the facts upon which he founds this inference do not warrant this conclusion. In all the cases of general paralysis he has examined, there was, besides the change in the grey structure, some alteration, either hardening, serous infiltration, or softening, of the white or fibrous substance; and in most cases, in addition to these, there were adhesions of the principal planes of the cerebral substance to each other.

239. From the circumstance of the grey substance of the hemispheres being found in a state of disorganisation or atrophy, in cases where intellect was abolished, and the fibrous structure being natural where muscular power was unaffected, as well as from the fact of lesions or wasting of this latter structure being observed where voluntary motion was lost or affected, M. Foville infers, that the function of the grey structure of the brain is essentially connected with the intellectual operations, and that the office of the white or fibrous part is subservient to muscular action; and consequently, that—1st, morbid changes in the former part are directly connected with intellectual derangement; and, 2dly, those in the latter portion are connected with disorders of the motive powers. He, however, admits, that in some affections of the maniacal class succeeding the action of debilitating causes, — as in the puerperal state,—nothing has been discovered in the brain more striking than its extreme and general paleness; and that, although some mottled appearances of a light red or rose colour are met with, these changes are too slight to be considered as idiopathic. M. Foville is therefore induced to consider this form of mental disorder to be symptomatic of some deep-seated disease of the uterus or abdomen. But, unfortunately for his argument, of several cases of puerperal mania which I have treated, I have not met with one that did present any serious or deep-seated disease in these parts. There can be little doubt, however, that the contradictory evidence given by different observers of the appearances of the brain in cases of insanity, is partly accounted for, as remarked by an able writer, by the existence of cases in which the affection of the brain is merely functional and sympathetic,— the primary disease being in some other organ, especially in some of the abdominal viscera.

240. The evidence of those who believe that insanity, although often connected with organic lesions of the brain, especially in protracted and extreme cases, does not necessarily depend upon them, requires some notice. Here the experience of M. Esquirol attaches to itself great importance. He remarks, that the bodies of lunatics offer numerous varieties as to the situation, number, and kind of morbid appearances, and that the lesions of the encephalon are neither in relation to the disorders of the mind, nor to the maladies complicated with it. Some lunatics, whose mental and bodily disease indicated extensive organic lesions, have presented slight changes in the brain; while others, whose symptoms had been less severe, have been subjects of great and numerous alterations. But even in the most protracted cases of insanity, no organic changes whatever have been traced, either in the brain, or in its membranes. He goes on to state, "that pathological anatomy is yet silent as to the seat of madness, and that it has not yet been demonstrated what is the precise alteration in the encephalon which gives rise to this disease." The various states of the brain, compatible with integrity of the mental faculties, have never been satisfactorily investigated, and probably will never be accurately ascertained; and it is by no means easy to distinguish, with sufficient precision, the appearances resulting from, or belonging to, concomitant maladies, from those which belong to the mental affection. M. Esquirol observes, that organic lesions of the brain are declared by symptoms distinct from the mental disorder; that chronic inflammation produces compression and paralysis, and paralysis results from cerebral hæmorrhage; and that tubercles, tumours, and softening of the brain have their peculiar symptoms, which cannot be confounded with mental alienation. Moreover, the sudden and instantaneous relief experienced, in some cases of madness, is not to be forgotten; nor the fact, that every part of the brain has been found altered, suppurated, destroyed, without chronic lesion of the understanding.

241. The maniacal form of insanity is rarely fatal, owing to any lesion of the brain; but from fever, phthisis, and other associated maladies, or from sudden exhaustion of the sensibility or nervous power necessary to life. In a case which terminated in this latter manner, no lesion was observed in the brain after death; and in a young woman, accidentally killed in recent and furious mania, the brain and its membranes were likewise devoid of change. When a case is watched during life, M. Esquirol thinks that the period at which the organic lesion of the brain commences, may be known by the symptoms. When mania has existed long, he is of opinion that the weakness of the last days of life disposes to local inflammations. Upon the whole, he concludes, that, notwithstanding the labours of MM. Foville, Calmeil, Bayle, and Guislain, the organic reason of mental derangement is still undeclared. "Thirty years ago," he adds, "I should have written willingly on the pathological cause of insanity: I will not now attempt so difficult a labour, — such are the uncertainty and contradictions in the results of the examination of the bodies of lunatics after death up to this day. But modern researches permit us to hope for more positive, clear, and satisfactory notions." In another place, he admits, that a difference in the results of researches may arise from the greater care with which the brain is now dissected, and the slightest changes observed; and that, at earlier periods of the investigation into the pathological anatomy of insanity, an account was kept only of obvious alterations.

242. Respecting this matter, M. Guislain appears to steer a middle course in his more recent work on Insanity. After various details, he concludes, that, in the greatest number of organic lesions of the brain, a moral origin and functional state of disorder, without alteration of structure, first exists; and that, when such alterations are present, they consist chiefly of whatever causes pressure of the brain, as effusion of serum, or of blood, lymph, or the formation of a false membrane; or of constriction of the organ by its membranes, which, in their state of engorgement, incarcerates, or strangulates, in some respects, the hemispheres; or of softening, or other disorganisation, to an extent that is incompatible with the due exercise of the

mental manifestations. He adds, that *induration* of the brain has been often observed by him, especially in the parietes of the lateral ventricles, and in the rachidian bulb, or upper portion of the medulla oblongata: that epileptic convulsions frequently attend it; that convulsions are often also caused by organic lesions of the membranes, and of the cineritious structure, but not constantly either by these, or by induration; and that they may occur even without any visible change of tissue. He concludes, that absence of organic alterations of the brain is indicated by the full possession of muscular action and motion, and that the existence of them is evinced by lesion of muscular motion and of sensibility — that simple disorder or excitement of the mental faculties, without dementia or palsy, exists independently of softening or compression of the brain; and that dementia or extinction of the intellectual powers may depend — 1st, upon sanguineous engorgement of the brain; 2dly, upon effusion of serum between the membranes or in the ventricles; 3dly, upon extravasation of blood between the membranes or in the substance of the brain; 4thly, upon softening of this organ; 5thly, on atrophy of it; 6thly, on induration of it; and, 7thly, upon exhaustion of its vital influence.

243. ii. Alterations in the Thoracic Viscera. — *A*. The *lungs* are diseased in a very large proportion of the cases of insanity which terminate fatally. The proportion has been differently estimated by the writers already noticed. M. Georget declares that he has found organic changes in the lungs in at least three fourths of the cases which he had examined; and phthisis to have been the cause of death in more than half the lunatics in Salpêtrière. He describes the pulmonary disease as always chronic, and often so obscure as not to be detected until the body is inspected. In these cases, the patient neither coughs nor expectorates, and he makes no complaint: he wastes, gets weak; looseness or constipation succeeds; he dies; — these changes take place slowly. Yet, notwithstanding the absence of cough and expectoration, excavations are found in the lungs after death. But instances of latent phthisis occur independently of insanity. When, however, both maladies are associated, the latter is more frequently sympathetic, or dependent upon the constitutional disturbance caused by the pulmonary disease, than is generally supposed; and it then sometimes does not appear until the softened and absorbed tubercular matter has contaminated the circulation, and thereby disturbed the functions of the brain. I have observed in persons predisposed to insanity, as well as in others, that, when tubercles are developed in the lungs, and when softening and ulceration follow without any communication having been made with a bronchus, the progress of the disease is generally latent. The tubercular softened matter undergoes changes during its retention; causes thickening or condensation of the parietes of the cavity containing it, even whilst the cavity continues to enlarge, and, if it be not evacuated by the bronchi, neither cough nor expectoration will be present. But the constitutional disturbance caused by the accumulated matter, as well as by the organic lesion of the part containing it, and still more by the absorption of a portion of it into the circulation, will so disturb the organic nervous functions, as to occasion, first, functional disorder, and consecutively, even organic lesion of such organs as may be most prone to disease from either an original or an acquired predisposition.

244. *B*. The *heart* is often changed in structure, in fatal cases of lunacy. Indeed, all the lesions of which this organ is susceptible, have been found in the bodies of the insane; but hypertrophy, passive dilatation, and softening, of the parietes of the cavities, seem to be the most frequent. The proportion of cases in which organic alterations of the heart have been found, has been differently estimated by writers. Romberg (Nasse's *Archiv. f. Med. Erfahr.* 1817.) believed that five out of seven bodies present lesions of this organ; and M. Foville considered that five out of six display alterations either of it or of the great vessels.

245. iii. Alterations in the Abdominal Viscera. — *A*. The *digestive mucous surface* very frequently presents evidence of inflammatory action, especially as respects certain of the consequences of this state. M. S. Pinel met with inflammatory appearances in this situation in 51 out of 269 bodies of lunatics; and of these there were only 13 of disease of the other abdominal viscera. These appearances have been also observed in a number of cases by Prost, Percival, and Guislain.—The frequency of displacements of the *colon*, first insisted upon by Esquirol, and especially with reference to melancholia, has already been attended to (§ 119.); and has been remarked also by Bergman, Müller, Annesley, and Guislain. In most of the cases described by Esquirol, the displaced colon presented none of the consequences of inflammation. In some of the instances observed by Percival and Bergman, the colon was contracted or more or less reduced in calibre through a great part of its length; in others, it was in parts dilated and contracted, as well as displaced. M. Guislain attributes both the displacement and the contractions to inflammatory action; — the latter most probably arises from this cause; but the former cannot always thus be accounted for. From the few instances which I have had an opportunity of observing, and from the history of many of those which I have seen recorded, it seems probable that most of the changes observed in the colon have been consequent upon asthenic inflammatory irritation, with diarrhœa, and occasionally with a dysenteric or an irregular action of the bowels, which had existed at some time or other during the course of the mental disorder, and especially at a late period of its progress. Dr. Percival (*Dublin Hospital Rep.* vol. i. p. 144.) observes, "that, on the dissection of cases of insanity which have terminated fatally from chronic diarrhœa, the intestines generally exhibit an extensive mass of disease. The mucous membrane is inflamed, thickened, and partially eroded, and the area of the canal diminished, often considerably, in the lower intestines." The mesenteric glands are often found more or less enlarged and indurated. In addition to these changes, hæmorrhoidal tumours and fistula in ano are not rarely met with in dissections.

246. *B*. Although much importance was formerly attached to disorders of the *liver* in causing insanity, yet the researches of recent writers do not tend to confirm the frequency of this connection. Esquirol, S. Pinel, Guislain, and Foville

found comparatively few cases which presented organic changes in the liver and biliary apparatus. It is probable that lesions of the liver, in connection with insanity, are more frequent in this country than in France, when we consider the influence of the abuse of ardent spirits in causing both insanity and liver diseases. In a case attended by Dr. SUTHERLAND and myself, at the time of writing this, the liver is greatly enlarged. The frequency, indeed, of biliary disorder in the insane cannot be doubted; and the occasional association of organic lesions of the biliary organs with mental disorder will be allowed. The chief doubt, in cases where these organs present alterations, will be as to the nature of the connection; for it will be admitted, that disease of the liver will sometimes affect the functions of the brain sympathetically, and that disease of the brain will exert a similar sympathetic influence upon the functions of the liver; and hence the priority of affection of either of these organs will not readily be ascertained.

247. *C.* Alterations of the *gall-bladder*, *calculi* in this viscus or in the hepatic ducts, lesions of the *peritoneum* and *omentum*, of the *mesentery* and *mesenteric glands*, of the *pancreas* and *spleen*, of the *kidneys*, and of the *uterus* and *ovaria*, have been severally found in the boidies of the insane, by BONET, SCHULZE, MARCARD, OBERTEUFFER, PIDERIT, JONES, PERCIVAL, POWELL, STARK, and others; but these have probably been accidental lesions, although they may, in a few instances, have had some influence in causing mental disorder, particularly in persons otherwise disposed to it, by affecting the organic nervous energy in general, and especially that portion actuating the brain.

248. VI. CAUSES of INSANITY. — Few subjects are of greater importance than a just recognition of the numerous causes of insanity,— of their individual and combined modes of operation,— of the influence they exert in various forms of succession, — and of the progressive changes they induce before the effect upon the mind is fully developed. And the importance of the matter is not limited to its bearing upon the treatment of the malady; but is even still greater in respect of prophylactic measures, and of rational plans of mental hygiene. In discussing this subject, I shall consider —*first*, the predisposing causes, or the numerous circumstances which render the mind more susceptible of, or prone to, disorder, than in its natural and healthy state; and, *secondly*, those causes which more immediately produce or excite the disorder. And it must not be overlooked, that whilst the individual influences comprised under the former class are often variously associated in creating a susceptibility or proneness to mental disorder, the occasions or causes belonging to the latter class frequently act also in conjunction, or in immediate succession.

249. i. THE PREDISPOSING CAUSES are the most important objects of study, particularly in respect of their bearing upon hygienic and prophylactic measures. The prevention of so terrible an infliction, as insanity is, must be even of more importance than its cure; since the person who has once been insane, seldom wholly regains his former social position, but is regarded with more or less suspicion, and a union with him is avoided by prudent families. The discussion of this class of causes assumes, moreover, increasing interest and importance, when we consider, that many of the circumstances comprised by it are of more frequent occurrence now than formerly, and are more influential in exhausting, weakening, and dissipating the mental powers in the present state of society, than in former epochs of civilisation; and that several of them may be even viewed as altogether arising out of existing social relations.

250. *A. Constitutional predisposition* is amongst the most predisposing causes of insanity. It may arise—*first*, from a certain conformation, temperament or physical and mental constitution, derived from the parents, — or, *secondly*, from an original predisposition or conformation, independently of disease in any of the parents, — or, *thirdly*, from a state of constitution gradually acquired, or arising out of the continued operation of causes which deteriorate or otherwise change the organic nervous and vital powers, and consecutively the digestive, assimilative, and effective functions. In the *first* of these modes, the predisposition is transmitted from the parents: in the *second* and *third*, it is generated *de novo*, and subsequently admits of transmission to the offspring, although not so certainly as in the first case.

251. *a. Hereditary predisposition.* — M. ESQUIROL states, — and the circumstance is confirmed by the observation of others, — that persons born before their parents had become insane, are less liable to mental disorder than those born after it has manifested itself; and he further observes, that the morbid tendency, or the actual disease, where it is transmitted hereditarily, is apt to show itself in different individuals of a family at a particular period of life. Instances illustrative of this latter circumstance have been adduced by him, and by Dr. BURROWS, MM. FALRET, GEORGET, and others. The hereditary predisposition to insanity, M. ESQUIROL observes, is not more surprising than the predispositions to gout, phthisis, or other diseases. It may be traced from infancy; and it even explains a number of caprices and irregularities which, at a very early period, ought to put parents on their guard against the approach of insanity, and to guide them in the education of their children. In such cases, the education should tend to render the body robust, and to give tone to the nervous system. The constitution of the offspring should be changed as much as possible, by placing them in circumstances different from those which surround them, or which have influenced the constitutions of the parents.

252. In some instances, one particular form of insanity is transmitted; either dementia, mania, melancholia, or states of mental disorder followed by suicide, being thus observed in the same family. The particular variety of insanity evidently depends upon the temperament, which, with the predisposition to this disease, is derived from the parents. Not only the same form of mental disorder, but also the same physical disease complicating it, or terminating it, are apt to appear in the same family, more generally, or even exclusively; yet there are frequent exceptions to this rule. Where an hereditary disposition exists, different grades of the disorder, rather than different forms of it, are commonly observed, — in one, merely various eccentricities; in another, partial disorder of the moral powers; in a third, disorder of the understanding; and, in a fourth, mania, dementia, &c. In families, also,

in which insanity is hereditary, there is occasionally observed a greater tendency to diseases of the nervous system, than in other families, — as, to epilepsy, chorea, convulsions, palsy, &c. Dr. Prichard justly believes that a constitutional tendency existing hereditarily, or arising in the other modes about to be pointed out, is more important, in respect of the frequent occurrence of insanity, than all the other causes taken together. It cannot be said, with propriety, alone to give rise to mental disease, without any exciting occasion; but, if it be very strong, mental disorder will follow the operation of ordinary or very slight causes.

253. Dr. Burrows remarks, that Esquirol assigns only 152, out of 264 cases, in his private practice, to this cause; but that an hereditary predisposition existed in six sevenths of the whole of his own patients. The most exempt from this taint were those whose mental disorder had a sympathetic origin; as in puerperal mania. Out of 57 cases of this latter affection, he could trace an hereditary taint in only about one half. But, where it existed, the disorder was more apt to return. Dr. Burrows considers that this cause is more common in the higher, than in the lower classes; as the former most frequently marry in their own rank, or even in their own families; and that wherever the system of clanship, or family connection, has been most strictly preserved, there it most prevails. Examples of this are said to have been numerous in the old Highland families of Scotland; and Boëthius mentions some very stringent measures which they adopted, to preserve from hereditary maladies, or rather to prevent the procreation of those who might be tainted by them. That hereditary influence is less common in the lower classes, than in the higher, is shown by Sir W. Ellis's report of the Middlesex Lunatic Asylum. There, only 214 cases, in which the disease was inherited, were ascertained, out of 1380 patients admitted; and for 125 of these cases, no other cause of the malady than this could be assigned. It has been supposed, that numerous instances of insanity occur among the Jews, from the circumstance of their having kept themselves more free, than all other races, and for a longer time, from intermarriage with strangers. I believe that mental disorders are frequent among them; but other causes may contribute to the frequency. Dr. Burrows states, that the youngest insane patients he ever had, belonged to a family of this race; and that in it he has observed the father and mother and six of their children insane. He further remarks, that insanity is very prevalent among Quakers, who usually intermarry in their own fraternity.

254. It may be presumed, that, when an hereditary predisposition to insanity exists in both sides of a family, the risk to the offspring will be much greater, than when it is in one side only; and that, when this latter is the case, the child, who bears a very marked resemblance, in constitution and mental character, to the parent exempt from hereditary taint, will be most likely to escape the mental disorder; and the hereditary disposition will fail of being perpetuated by him, unless reinforced by a similar taint, by marriage. But the child that most resembles the tainted parent will be the most liable to experience, and to propagate, the mental malady.

255. There are two points respecting which opinions are often required from physicians,—namely, whether or not a person born of parents who have never themselves been insane, but who, one or the other, is descended from a family thus afflicted, may propagate the malady to his offspring? — and whether or not a child born before insanity had appeared in either parent, is as liable to become insane, as one born after the malady was developed? The *first* question, Dr. Burrows believes, should be answered in the affirmative, because he has met with insane persons, neither of whose immediate parents had themselves been insane, but some of the progenitors, or an uncle or aunt, on one side or other, had been so afflicted. I have known cases, where the nearest progenitors to the patients, who had been disordered in mind, were grand-aunts or grand-uncles. The *second* question has been partly answered above, (§251.), by M. Esquirol. But Dr. Burrows considers, that a child born, either before or after the accession of insanity in the parent, provided that parent's progenitors or relations of blood had been insane, is liable to the malady; but that, if the insanity of the parent were adventitious, and not hereditary, the child born before mental disorder had appeared, will not have it by inheritance: how far a child born after the occurrence of adventitious insanity, is liable to mental disorder, is decided with difficulty. This writer believes that, whether it be adventitious or hereditary, once occurring, the morbid diathesis is thereby stamped, or generated.

256. *b.* The offspring may possess a *connate predisposition* to insanity, although neither of the parents, nor of the grand-parents, nor any member of their families, had been the subject of it. Burton long since remarked, upon the authority of the older medical writers, that the offspring procreated of parents when they were far advanced in age, are more subject, than others, to melancholy madness. There can be no doubt, that whatever produces enervation or debility in the parents, will occasion a certain amount of predisposition in their children to nervous affections and to mental disorder; and I believe that habitual drunkenness, or the abuse of spirituous liquors, by either parent, and especially by the mother during gestation and lactation, causes numerous diseases in the offspring, and more particularly disorders of the functions of the brain, and nervous system in general. It also is very probable, that the children of persons who have been weakened by premature or unnatural sexual indulgences and vices, or who are gouty, hypochondriacal, hysterical, or otherwise debilitated, will be more susceptible of the operation of the exciting causes, than the offspring of those who are constitutionally robust and healthy. M. Esquirol affirms, that many facts have been observed by him, proving, that a strong predisposition to madness has arisen from fright or terror sustained by the mother during pregnancy; and that marked cases of this kind occurred during the French revolutions.

257. It has been long and generally supposed that marriages within a confined circle, as between cousin-germans, have the effect of impairing both the mental and constitutional powers of the offspring. The opinion seems well founded, and is undoubtedly just, if the breeding in-and-in be continued for two or more generations. The children of such families often die in infancy or

early youth; are frequently scrofulous, and are liable to hydrocephalic and convulsive diseases; and, if they grow up, are frail in body and imbecile in mind, or predisposed to mental disorder. — It is doubtful how far the scrofulous diathesis may dispose to insanity; but I believe that it has a very considerable influence.

258. *c.* That there may be not only — 1st, *an hereditary*, and, 2dly, *a connate*, but, also, 3dly, *an acquired, predisposition of constitution* to insanity, I firmly believe. This last state is quite independent of the two former, and of temperament or diathesis, and is generally the result of the operation of debilitating causes during infancy, childhood, and the periods of puberty and early adult age. Indeed, many of the moral and physical exciting causes may have this effect, when acting in a slight but continued or constant manner. But there can be no doubt, that early indulgences; a tender, sensual, and luxurious education; vicious modes of early instruction; masturbation, and premature or vicious sexual indulgences; exhausting pleasures, and inordinate mental and physical excitements, relatively to the states of nervous and constitutional energy; and various other causes, which debilitate the frame, increase the general sensibility, and augment the susceptibility of the brain and nervous system, — will often develop, to a greater or less extent, a predisposition to insanity, which may be appropriately termed acquired.

259. It has generally been supposed, and poets have sung, that a great genius is closely allied to insanity. This is most erroneous. Persons with a too active and ill-regulated imagination are predisposed to mental disorder; but those who possess powerful intellects, and a vast range of powers and of intelligence, are much less disposed to it than others; and, if they have become insane, the causes have been of an energetic kind, and overwhelming from their activity or association.

260. *B. Temperaments, &c.* — Persons of the melancholic temperament are more liable to the melancholic states of insanity, than others; those of the nervous temperament, to mania, dementia, and monomania; and those of the sanguine, or sanguineo-nervous, or irritable temperaments, are attacked more frequently with mania, than with any other form of mental disorder. M. Esquirol observes, that, when persons of the lymphatic or phlegmatic temperaments, or of a pale exsanguineous habit of body, are affected with mania or monomania, dementia or incoherency is more liable to supervene in them, than in others. This form of insanity is also likely to follow in persons of a full habit of body, with a thick head and short neck. — Mental disease pursues a somewhat different course in persons of different temperaments. Choleric or warm constitutions, or those with black hair and eyes, and vigorous frames, become violently maniacal, but experience a shorter disorder, and more frequently terminating in a marked crisis, than others. Individuals of a fair, pale complexion, with light hair, fall more readily into chronic mental disease: the dark-haired are liable to become gloomy monomaniacs; red-haired lunatics are disposed to violence, and are treacherous and dangerous. He gives the following table of the general appearances of a number of lunatics: —

External habit of body	Of the medium fulness of habit	122
	Thin or emaciated	60
	Fat	6
Height	Tall	102
	Short	19
The eyes	Chestnut or brown	102
	Blue and light	98
	Black	17
The hair	Chestnut	118
	Fair or flaxen	39
	Grey or white (aged)	36
	Black	31

261. *C.* The *form of the head in lunatics* has attracted the attention of Greding, Pinel, Georget, Gall, Spurzheim, and others. M. Pinel believed that there are certain peculiarities in the shape of the skull, frequently observed in the insane, and particularly in cases of dementia and idiotcy. The two most prevalent forms which he specifies, are — 1st, a laterally compressed shape of the head, giving a very long diameter from the occiput to the forehead; 2dly, a short and almost spheroidal form, — the above diameter being shorter than usual. He could not, however, detect any mental conditions corresponding with these opposite shapes. M. Georget states the results of the examination of upwards of 500 heads in the collection of M. Esquirol. One half of these presented nothing remarkable, being regular and well formed. The other half were more or less peculiar in the form and appearance of the skull, and in the thickness, density, and organisation of the bones composing it. Some skulls were unequally developed, — one side being more arched and larger than the other, especially the right. Others were somewhat oblique, — one side of the head being too forward, and the other much behind. I have seen instances where these two malformations were conjoined. M. Georget found some skulls in this large collection, in which the antero-posterior diameter was not more extended than the lateral: in these, the cavity was much elevated, especially in the posterior part. The cavities of the base of the skull presented likewise inequalities; those of one side were sometimes larger than those of the other. Persons who have contracted heads, particularly as now described, not only are more liable to insanity, than those whose heads are well formed, but lapse more readily into a state of dementia or fatuity, and are consequently less curable than others. It is chiefly in these hopeless forms of general insanity that these irregularities of the form of the head are observed. In *idiots*, as I shall show hereafter, these malformations are still more remarkable.

262. *D. Sex.* — The ancients, and especially Cælius Aurelianus, supposed that insanity occurred more frequently in males than in females. Recent investigations, however, have shown this not to be generally the case, in modern times. Dr. Prichard quotes M. Esquirol, as stating the proportion of insane females in France, to insane males, to be 14 to 11. M. Voisin considers the proportion as 13 to 10. In all Italy, the proportion is different — it being about 5·65 males to 5·00 females. M. Guislain states, that in Holland and Belgium, the number of lunatic females, to males, is as 34 to 29. Dr. Prichard assigns the proportion in Great Britain and Ireland, of male to female lunatics, as 13 to 12; and observes that, in England, the number of insane men, compared with that of women, is more considerable than in Scotland and Ireland; and this excess on the side of the males is greater, according to Dr. Burrows, in the higher than in the lower classes of society.

M. ESQUIROL confirms this observation in respect of France; and further states that, in the North of Europe, — in Germany, Denmark, Norway, and Russia, — the proportion of male to female lunatics is as 3 to 2. Dr. JACOBI furnishes nearly the same results in regard of Prussia. In the United States of North America, the number of insane males is stated to be much greater than that of female lunatics. In the States of New York, Pennsylvania, and Connecticut, the proportion of the former to the latter is nearly 2 to 1. In summing up the results of his inquiries obtained from various parts of the civilised world, M. ESQUIROL finds that the general proportion of insane males to females is about 37 to 38.

263. The occurrence of insanity among females is partly owing to the nature and vices of their education; to their greater sensibility and keener feelings; to the restraints imposed upon their desires and emotions; to the crosses, chagrins, and disappointments to which they are liable; to reading romances and novels, and thereby exciting the imagination, without improving the reasoning powers; to the addiction to music, and the want of salutary and invigorating occupations; and to the life of celibacy they are often doomed to lead. These, and various other moral causes, about to be noticed, contribute remarkably to the production of insanity among females.

264. The physical causes also operate energetically in producing insanity among this sex; but they are chiefly disorders of the sexual organs. Irritation of the uterus, or of the nerves supplying it, and its appendages; suppression, retention, or inordinate flow of the menses; and various organic lesions of these parts; have a very marked influence, sympathetically, upon the functions of the brain. Many of the moral causes, and emotions of mind, have but little influence, until they have first disordered the functions of the womb; and as soon as this organ is disordered, it reacts upon the brain, and heightens the effects of the moral emotions. In such cases, as well as in many others common to both sexes, the moral causes are often insufficient to induce the mental disorder, until they have first occasioned physical disturbance in some organ; which disturbance, from its sympathetic influence upon the brain, becomes an additional cause of the disorder. Females, however, are often so circumstanced as to experience very serious disorder of the circulation of the brain, from energetic mental emotions, occasioning an immediate effect upon the manifestations of this organ, before any disorder can appear elsewhere. And, in some cases, the consequent disorder is produced almost simultaneously in both the brain and the functions or state of the uterus. We observe this especially in the puerperal states, and, still more particularly, soon after delivery.

265. M. ESQUIROL remarks, that females become insane at an earlier period of life, are more liable to lapse into dementia, and are more disposed to religious insanity and to erotic delirium, than males; and that all varieties of insanity, in them, are generally complicated with hysteria. Males, on the other hand, are more liable to mania and violence; they are more dangerous, and more difficult to restrain: women are more noisy; cry, and talk more; are more dissembling, and less readily confide in those about them.

266. *E. Age.* — Insanity, in the forms which have been described, is rarely observed before the age of puberty. Imbecility and idiotism are always observed in childhood; but the instances, in which any form of true insanity has occurred at any epoch before puberty, are very few. They have, however, been recorded by J. FRANK, Dr. HASLAM, M. FODÉRÉ, M. ESQUIROL, Dr. PRICHARD, and one case occurred in my own practice, and that was caused by fright. Two cases mentioned by M. ESQUIROL proceeded from the same cause. He met with one case of melancholia complicated with marasmus, in a child eleven years of age, remarkable for his large head and mental precocity. Instances, however, more frequently occur of children becoming melancholic, and even delirious, from jealousy and envy, than is generally supposed. They sometimes are thus affected, although often only temporarily, by seeing the attentions of those to whom they are much attached, bestowed upon others; and by being outstripped in obtaining distinctions at school.

267. After fifteen years of age, insanity ceases to be a rare occurrence. About the period of puberty, in females, or when the catamenia are about to be established, melancholia and mania occasionally appear, and especially if the growth be rapid, and the catamenia are retained, suppressed, insufficient, difficult, painful, or irregular. In these cases, and still more so at a later period, hysteria is generally attendant upon the mental disorder. During the first few years after puberty, in the male, mania and melancholia not infrequently occur; the former generally from the excitement of sexual desires, the latter from masturbation or venereal excesses. M. ESQUIROL remarks, that mania, in all its forms of excitement, appears chiefly in early life; melancholia, in middle age; and dementia, in the advanced epochs of existence. In youth, insanity assumes an acute and violent course, and often terminates by a remarkable crisis: in middle age, it is more prone to become chronic, and is oftener complicated with disorder of the abdominal viscera; but is sometimes resolved by hæmorrhage from the hæmorrhoidal vessels, or by diarrhœa. At an advanced age, it is apt to pass into dementia, and to be complicated with paralysis, apoplexy, &c.; and recovery is much less to be expected. However, dementia may occur in the young; and very aged persons may be attacked by mania, and recover from it, — but these are only exceptions from the rule just stated.

268. The *ages* at which insanity most frequently appears, are — that between 30 and 40; next, that from 20 to 30, and from 40 to 60. M. ESQUIROL, however, states, that the maximum number of admissions of cases of insanity take place from 30 to 35 years of age: that each five years, from 20 to 35, give nearly the same number: that the admissions of males are more numerous from 25 to 30; and those of females, from 35 to 40: that the periods from 30 to 35 follow thereafter, for the men; and from 40 to 45, for the women: and that the admission of males from 20 to 25 years of age occupy the third rank of frequency; whilst those of females hold only the sixth rank. From this it follows, that insanity is most frequent at an earlier age in men, than in women. M. ESQUIROL further states, that the wealthy classes are much earlier attacked — or

rather, are affected in greater numbers at an early age — than the laborious. M. **Georget** adduces the following calculation of the ages of insane persons, on admission into several institutions in England and France : —

From 10 to 20 years of age	365
20 to 30	1106
30 to 40	1416
40 to 50	861
50 to 60	461
60 to 70	174
70 and upwards	35
	4409

269. Yet, although a greater number become insane from 30 to 40, than at any other age, still the number may not be really greater, relatively to the proportion of persons in society of farther advanced ages ; and hence, 174 instances of the malady occurring in persons aged between 60 and 70, may actually show a greater prevalence of it at that age, than 1416 cases appearing between 30 and 40 years of age. That this, however, is not the case, — and that a greater number, relatively to the proportion of persons existing in the community at that age, actually become insane between 30 and 40 years, — is proved by the number of persons surviving out of each 1000 at successive periods of life. In this country, 410, out of each 1000 born, will reach 30 ; and 345 will reach 39 ; but 220 will reach 60, and 140 will attain 70 ; and if the mean number of those between 30 and 40 thus be 376, and that of those between 60 and 70 be 146, it will be at once manifest, that the number of instances of the invasion of insanity is, relatively to the proportion of persons between 30 and 40 years of age, actually greater at that period.

270. M. **Esquirol**, however, believes that a proportionably increased frequency of mental disorder, with the advance of age, really does obtain, although the predisposition, thus arising from advancing age, increases in an irregular manner. The increased number of insane persons, he adds, compared with the population of that age, is very striking between 50 and 55 years. From 70 to 75, and from this age to 80, it becomes enormous, owing to the frequency of senile dementia. This is very probably correct; but it must not be overlooked, that a very large proportion of the cases of hereditary insanity occurs between 30 and 40, or even earlier ; and it is admitted, that these cases constitute the great majority.

271. *F. Education.*—There are few causes which more powerfully predispose to insanity than erroneous education and moral discipline in early age. — *a.* Too great indulgence in childhood, and previously to, as well as during, puberty, and a want of moral discipline then and up to manhood, with neglect of that education, which inculcates, and, indeed, enforces, proper principles of feeling and action, are undoubtedly amongst the most deeply laid foundations of insanity. Persons thus brought up, have their temper, emotions, and moral affections so little under command, — are so subject to ebullitions of passion, to caprices, or violent and fugitive emotions, — are so liable to act from momentary feeling and impulse, — as to acquire a disposition of mind, or moral character, not only most unamiable in itself, but also most prone to marked disorder, when subjected to its more immediately productive causes.

272. *b.* The premature and overstrained exertion of the mental powers is another most important cause of predisposition. In the higher and middle classes of society, the mind is excited much beyond its powers ; and the child, being required to perform too much, with its imperfectly developed faculties, experiences, as a consequence of such premature excitement, increased vascular action in the brain and its membranes, at a period of life most disposed to vascular disorder in this organ ; and the foundation is thus laid for chronic disorder, and especially for chronic inflammatory action of that part of the nervous system with which the manifestations of mind are most intimately allied. The quantity, as well as the diversity and range, of mental exertion, now required from both sexes at a too early epoch of childhood, and during the period which elapses from mere infancy to puberty, while both mind and body are only in an early stage of formation, must necessarily prove injurious, both mentally and physically, — and especially to those who are either delicately constituted, or tainted by any hereditary disposition to insanity. Therefore, when this disposition exists, not only should premature and overstrained mental exertion be avoided, but also should the feelings, the passions, and the actions be subjected to strict discipline — to a discipline not too harsh or rigid, but rational and consistent. The mind ought to be formed under a kind restraint, and imbued with correct principles, and with a due sense of moral and religious responsibility. In the present day, too much attention is paid to an early cultivation of intellect, and to the mere acquisition of knowledge of facts and phenomena, to the neglect of the education of the moral affections, and of just principles of feeling and of acting. The great ends of education, as now conducted, are, as respects the one sex, the attainment of that knowledge and of that range of information which may enable its possessor most successfully to compete in the general scramble for wealth, for advancement in society, or even for existence ; and, as regards the softer sex, the possession of such accomplishments, and the acquisition of so wide and so superficial a range of ideas, in a very limited period of time, as may strike or captivate, or may be more readily and generally made available in society, and thus become the current coin of the mind in conversation. These objects are pursued in education in a manner but too well calculated to overstrain the early intellect, to exhaust the feeble mind, and to derange the hereditarily predisposed. The mind is engorged with food, not of the most wholesome or digestible quality, beyond its powers of healthy digestion and due assimilation, and even before these powers are fully evolved ; and hence, but too frequently, follow disorders, varied in extent and intensity, of its most important and effective manifestations or functions.

273. *G. Climate and Seasons.* — *a.* It is very doubtful what degree of predisposition can be ascribed to climate and seasons, especially as most of the differences in the numbers of the insane in different *climates*, may be attributed to various moral and physical circumstances not necessarily dependent upon climate. In warm climates, and even in Turkey, and other Mahommedan coun-

tries beyond the tropics, and in hot climates, where the minds of the population are under the sway of the Romish and Greek churches, insanity is much less frequent, than in temperate and highly civilised countries. M. ESQUIROL, in accounting for the greater prevalence of insanity in temperate climates, attributes too much importance to sudden alterations or vicissitudes of temperature. The greater frequency of the malady in these climates is plainly attributable to other causes than this. I believe, however, that a predisposition to insanity, and particularly to connate and puerile imbecility, and to dementia, is to some extent generated by marshy or miasmatous places, particularly in low districts subject to inundations, and in low valleys placed deep between precipitous mountains. There, the mind and body are checked or weakened in the course of development, and the latter early becomes the subject of diseases which impair its vigour and further weaken the powers of mind.

274. *b.* The *seasons,* according to M ESQUIROL, have some influence in causing insanity,— but probably more as exciting, than as predisposing, causes. High ranges of temperature seem to have considerable influence in causing or in determining the character or form of the disorder, and particularly mania, or the higher states of the malady. M. ESQUIROL has given a table of the admissions into the *Salpêtrière,* during each month, for nine years, according to which it would appear, that the lowest number was admitted in January; and that the admissions increased progressively from March till July, when they reached the maximum. They then progressively decreased till October. From this month to March they varied somewhat in number, but not so much as to excite speculation.

275. *H. Professions, Employments, &c.* — *a.* The frequency or infrequency of insanity amongst persons pursuing certain professions or employments, is obviously to be referred to the several circumstances more immediately connected with these employments; but most of these circumstances will be more fully considered hereafter. The learned professions certainly furnish fewer cases of insanity, relatively to the numbers exercising them, than any other class of persons in the middle ranks of the community. This, probably, is owing to the education for the professions, in early life, being such as tends more than any other to develop, and to strengthen, the judging and reasoning powers, without exciting the imagination, or prematurely involving the feelings and passions. Some exceptions, however, may be found among young divines, who, from enthusiasm or anxiety respecting the state of their minds, have become partially or altogether insane; but such cases are comparatively rare amongst the soberly and regularly educated.

276. *b.* I believe that insanity is most prevalent among artists, musicians, and actors, relatively to the number of persons pursuing these occupations. This frequency obviously depends upon a great variety of circumstances, many of which will be found amongst the moral causes of this malady. In the present day, — for it was not so formerly, and in the palmy days of Italian art, — few artists receive an education, in early life, calculated to develop, or to strengthen, the intellectual and reasoning powers. The imagination is early and almost exclusively exercised; and many of the instinctive moral affections of mind (see note, § 66.), which exert so powerful an influence upon mental sanity, are so often brought into inordinate action, without the due control of sound judgment and strict principle, that first partial, and ultimately general, insanity is the more liable to appear. Besides, artists, in the wide acceptation of the word, are liable, in the exercise of their art, to sustained excitement, not merely of the imagination, but also of the feelings and passions, — to a certain tension of the mind, — tending to exhaust, and at length to disorder, the intellectual powers. There are few classes, moreover, who entertain more extravagant ideas of their own merits, than those to whom I now refer; and who, consequently, are more liable to jealousy, envy, disappointments, and wounded self-love. Poets and literary men are liable to the same imputations, — entertain the same ideas of themselves, and of others, as those who may be classed under the general denomination of artists; but, in general, their education is sounder, and better calculated to strengthen the reasoning or controlling powers of mind. In all, the sedentary occupations, the insufficient exercise in the open air, and the irregularities of living, or the alternations of abstinence and dissipation, aid the moral causes of the malady, in this class of the community.

277. *c.* It must necessarily follow, that insanity will vary in frequency, in different professions and employments, with the degree in which they respectively call into exercise those moral emotions or causes on the one hand, and the physical circumstances on the other, on which this malady has been found more especially to depend. Next to artists, in the liability to mental disorder, may be ranked, according to the tables of M. ESQUIROL, merchants and traders, and military men. This may be expected, especially if brokers or speculators in the funds or share markets are included under this head: and, indeed, merchants, traders, manufacturers, and speculators or gamblers in all kinds of securities or pseudo-securities, have, in recent times, so entirely fallen within the same category; and are, from the governor or director of the most powerful corporate bodies in the world, down to the very humblest adventurer in a bubble company, so generally and completely subjected, from the nature of their engagements, — from the epidemic scramble after gain at all hazards,— to alternate excitement and depression — to elated expectations and painful anxieties — to hopes and fears — to fortunate anticipations and humiliating disappointments; and have the prospects of being, or are, in fact, one day as rich as Crœsus, and the next even poorer than the meanest slave, — that the mind, which probably has never been strong, nor duly strengthened by wholesome education, and by the early inculcation of sound principles of feeling and acting, at last experiences, and manifests, the shock, in some one of the various forms of insanity. Shall the medical philosopher — contemplating the present state of society, seeing these things, and knowing the circumstantiality with which insane acts and crimes are published, commented upon, and rendered interesting to vulgar tastes and minds — be surprised at the existing prevalence of insanity, and one of its most common results — suicide? The weak, the injudiciously tutored, and the pampered, mind, after a career of ill-deserved prosperity, — a prosperity often as iniquitously enjoyed

as unjustly earned, — not infrequently experiences a reverse, which it is incapable of enduring without more or less of mental disorder; but the reverse is commonly attended by circumstances involving also many confiding and innocent persons; and thus more than one sustains a shock, before which reason is shaken or entirely overthrown.

278. *I. Previous attacks of insanity, or other diseases of the brain,* greatly increase the susceptibility of mental disorder. Although recovery from insanity often takes place without any subsequent manifestation of mental disease, and although even repeated attacks have been sustained, and a complete and permanent restoration has occurred nevertheless, — yet much more frequently madness leaves the person, who has once been its subject, much more prone to a return of it. In many cases, the patient continues, for a long period after recovery has apparently been established, more irritable and excitable than previously to the attack: he is irascible; very susceptible of impressions; and less capable of application to business, or of mental exertion. After every successive attack, this change in temper and character becomes more manifest, until the disease assumes a remittent, and ultimately a continued, form; a state of permanent incoherency or imbecility ultimately supervening.

279. Inflammations of the brain or of its membranes, frequent attacks of epilepsy, apoplectic and paralytic seizures, and fevers with predominant affection of the brain, often predispose to mental disorder. Indeed, these maladies are not infrequently both attended and followed by delirium, or some form or other of insanity, which generally disappears in a few days, or at most weeks, after the primary malady has evinced signs of amendment, or after recovery from it has taken place. When either of these cerebral diseases are thus complicated, the danger of the recurrence of a temporary, or a severe, or even a permanent, attack of insanity, or of a return of the primary disease, attended by a more complete overthrow of the mental powers, is much heightened. This is especially the case in respect of epilepsy, particularly when slight partial paralysis with mental disorder follows the fit. In such cases, incoherency, imbecility, and, ultimately, fatuity, often successively appear. In some instances, where the epileptic paroxysm is attended by violent mania, which subsides in a few days afterwards, the mental derangement gradually becomes permanent, and either supersedes the epilepsy, or continues complicated with it. When insanity is thus caused by epilepsy, sullenness, sudden irascibility, with a disposition to commit the most atrocious acts, and various manifestations of moral disorder, often characterise the malady.

280. ii. The Exciting or Productive Causes. — Certain of the causes which have been already considered, may, from their nature or intensity, give rise to insanity, without the aid of any exciting occasion, or, at least, of any so marked as to attract the notice of the patient's friends. On the other hand, many of the causes about to be noticed, either from their slight but often combined action, or from their continued influence, actually predispose to, rather than excite, insanity; or they affect so slowly and imperceptibly the mental powers, as well as the bodily functions, without giving rise to any sudden or manifest shock of the mind, as to change the character or constitution of both, and thereby fit or prepare them for the injurious impression of causes which would otherwise have been entirely innocuous. — The exciting causes have been very commonly divided into *moral* and *physical;* and under these heads have been also comprised, by some of the best writers, the causes already considered, as creating a predisposition to mental disorder. And when the circumstances just alluded to, respecting the operation of these causes, are considered, there can be but little fault found with this arrangement. Some authors have differed as to the comparative influence of *moral* and *physical* causes in occasioning this malady. But the difference has arisen chiefly from the more extended signification assigned to the latter term by some, and from their having comprised under it various important causes kept entirely apart by others, — and especially the greatest of all causes — hereditary predisposition. Leaving this, therefore, out of the arrangement, or, rather, considering it separately, there can be no doubt of the influence of the moral causes, in the production of insanity, being much greater than that of the physical. Still the matter is not so satisfactorily solved, especially by referring to statistical tables, as may be imagined. For, although it may have appeared, from the information received, that the malady was produced by some moral cause; yet there may have existed at the time, or closely upon it, some physical disorder, and especially some functional disturbance of the digestive, assimilative, and excreting organs, or a morbid susceptibility of the nervous system, or both, without the existence of which the moral affection may have been quite inoperative. Agreeing, however, with Heinroth, Pinel, Georget, Guislain, Prichard, and others, as to the great and predominant influence of moral over physical causes in the production of insanity; still, even in the cases where they seem to have been most influential, various physical or functional states or disorders may have existed, so as to predispose the nervous system to be affected by them; or the moral emotion may have first occasioned some severe physical diseases, of which the mental disorder was the more immediate effect.

281. In proof of the predominance of moral over physical causes, most writers refer to the great frequency of insanity among highly civilised people, and its almost entire absence from savage or barbarous nations. The data, however, are not to be depended upon, as respects savage communities. It is not correct to say, as many have, that insanity is unknown among them. It certainly is comparatively rare, or very seldom occurs, — but it does occur amongst the greatest of all savages; various circumstances, however, preventing persons in this state from being long troublesome to their friends or to the community, — or, in other words, once an individual "loses his head," — as the being insane is very generally termed, — he is soon got rid of; and his insane acts, before his state is recognised, often directly or indirectly terminate his existence. On this subject Dr. Prichard remarks, that, "in a barbarous state of society, the passions are under no restraint — the emotions are impetuous; hatred and malignity are in perpetual exercise; the fierce and sensual desires which are common to mankind and the inferior tribes, are indulged without limit. Nor

are the intellectual faculties without their exercise in carrying on the stratagems of barbarous warfare. We should conjecture that such a state of society, in which the passions are in perpetual and violent agitation, would not infrequently produce insanity." Still, I contend that these are not the chief moral causes of which this malady is so frequently a result; and that many of the physical disorders, which either predispose to, or produce, mental disorder, and which remarkably aid the operation of moral causes, are not very common in savage communities. If we contrast the emotions which powerfully affect the human mind in civilised society, with those which have been just noticed, the consequences resulting from the former to the mind itself, may be, in some measure, anticipated. When we consider the premature and excessive exertion of the faculties in highly civilised countries; the restraints imposed by social institutions and legislation, and the consequences which often arise out of them; the diversity of interests and of feelings brought into action by many pursuits, upon which wealth, honour, and even existence, depend; the long-continued anxieties, griefs, disappointed hopes, the family dissensions, and injured or lost affections; the chords of feeling too intensely strung; the prolonged or intense mental exertion; the continued tension of the imagination, or of the intellectual powers; the pride, ambition, and humiliations; the distractions of the mind by religion, by worldly speculations, and diversified engagements; the sudden reverses, the jealousies, and the numerous causes continually impressing the moral sentiments and affections, and increasing the susceptibility of the nervous system, as well as disordering the general health, — when we contemplate the prevalence, the frequent recurrences, and often the almost constant operation, of all these circumstances in civilised life, we cannot be surprised at the effects produced by them upon the mind and nervous system; especially when we find that they seldom act singly, but generally in combinations, or associated with various predisposing and exciting or determining causes.

282. There are, also, other considerations, not to be overlooked in attempting to account for the greater prevalence of insanity in civilised than in savage communities. Children of weak physical powers are seldom reared among the latter; and the higher intellectual faculties, and the finer and more elevated moral affections, — especially the powers of intellection, and the rational emotions of mind (see note, § 66.), — are imperfectly developed in them, and consequently less prone to experience or to originate mental disorder. In barbarous societies, the mind retains much of the constitution and character presented by it in childhood and boyhood in more civilised communities: it is incapable of comprehensive views and combinations of thought, or of prolonged exertion; it retains the sanguine disposition of youth, and is little susceptible of care and anxiety, and thinks of little, but of present gratification and ease. On the other hand, whilst civilisation develops all the finer emotions and affections, all the higher and more reflective faculties, and augments the susceptibility of the moral feelings, as well as the general sensibility, it tends also to disorder them the more, owing to numerous resulting circumstances, which inordinately excite or seriously disturb them, and which thereby often ultimately overthrow them altogether.

283. M. Georget, however, most probably over-rates the influence of moral causes in the production of insanity. He believes that 95 out of 100 lunatics have become so from the operation of the affections and moral emotions; and he states this to have been the opinion also of M. Pinel. It is in the age, he adds, in which the mind is most susceptible of strong feelings, and in which the passions are excited by the strongest interests, that madness is principally displayed. It is chiefly, however, in the higher and middle classes of society that the moral causes are most productive of insanity. This is shown by the researches of Esquirol, Georget, Guislain, and others. It is in them that the influence of civilisation, in increasing the frequency of the malady, is especially manifested; thus proving the justness of the remarks which I have ventured above, and which are partly founded upon my observation of the state of society in savage communities. Amongst the lower orders, physical causes have more influence than in the higher; and, of the moral causes, an unrestrained sway of the temper and passions is the most manifest. Physical causes are, according to the writers just mentioned, more influential in females than males; and, in the former, amongst the lowest classes, I would add, that violence of temper is the most productive moral cause of the malady. — In further considering the *exciting causes*, I shall offer a few observations — 1st, on the more remarkable emotions of the mind, of which insanity is often a consequence; 2dly, on the physical causes of the malady; and, 3dly, on certain circumstances in the general habits and manners, and in the social and political states, of our species, resulting from various combinations of moral and physical causes, which both indirectly and immediately occasion mental disease.

284. *A.* Of certain Moral Emotions. — *a. The more violent passions and emotions,* sometimes, by their sudden or vehement action, more or less disorder the functions of the brain, — especially violent anger, and terror. Unrestrained bursts of temper are very frequent causes in the lowest classes of the community, and particularly in females — in whom it acts either directly on the brain, or consecutively, by first disordering the uterine functions, or in both modes. M. Esquirol, however, assigns a greater influence to fright than to anger; but mania is the form of the disorder which most frequently results from both these causes. Dementia much more rarely is occasioned by them. These emotions are the most intense and the most sudden, of which the human mind is susceptible; and, fortunately, they are amongst the shortest in their duration. The nervous system, and particularly the functions of the brain, are more violently agitated by them than by any other; and in many instances, where no predisposition to insanity exists, fits of convulsion, tremors, and various nervous affections, are caused by them, — especially in weak, nervous, and susceptible constitutions.

285. *b. Care, anxiety, grief, distress, and all the depressing emotions,* are the chief causes of mental disease. In the same category may be included, domestic griefs, and disagreements, family dissensions, ill-assorted marriages, reverses of fortune, disappointments, prolonged fears, men-

tal humiliations, jealousy, wounded self-love. The tables which I shall give hereafter, will show the relative influence of these and other causes in one civilised country. It will readily be admitted, that it is chiefly in communities far advanced in civilisation, that these causes are most productive of this malady. These causes act very generally in combination, either with one another, or with various predisposing and physical circumstances: many of them operate upon the mind slowly and silently, and only by first disordering one or more of the bodily functions. Joy, and the more exciting emotions, less frequently occasion insanity than is commonly supposed. Esquirol states, that the opinion of Mead, as to the frequency of mental disorder from this cause, is not well founded; but he admits the importance attached by Pinel to the struggle between religious and moral principles, and the passions and worldly interests, — a struggle sometimes long sustained, and terminating in impairment of reason, and especially in melancholia. It is not only in their individual, but also in their combined, operation, that the causes of insanity should be studied: and in order that sound principles subservient to rational hygienic and prophylactic measures may be deduced from the study, the various combinations and successions of action should be recognised; and the intermediate changes, mental and physical, ought to be traced as far as the means of investigation may be furnished us. It is chiefly, also, by ascertaining the changes first induced in the functions of important organs, and the succession of morbid actions resulting therefrom, that we can be enabled to form rational or successful indications of cure.

286. *c. Religious impressions, and apprehensions of a future state*, are amongst the most important mental causes of insanity. — *Religious madness*, as it has been termed, has long been an interesting subject to the philosophic physician; and its frequency in Great Britain demands from him a particular notice of the various circumstances connected with it. — I cannot agree with Dr. Prichard, in considering that the number of persons, who become insane from religious hopes and fears, is much less considerable than it is generally supposed to be. The frequency of disorder from this cause varies remarkably in different places and in different times; and the mischief often becomes either endemic or epidemic, from every fanatic, or ambitious preacher, who is desirous of acquiring notoriety, or of being the originator, or the leader, of a particular sect, — from any one, however slightly imbued with religious knowledge, or however ignorant, who wishes to be distinguished amongst those who are equally ignorant, but more honest, with himself, — and from any one, who, already partially insane, believes himself inspired, and called by the Almighty to instruct and convert men, before he is himself even partially instructed, — being permitted to "deal damnation around the land," and to excite the feelings and the fears, or to distinguish the hopes, of the ignorant, the nervous, the susceptible, and of the hysterical, without any control as to education, doctrines, or religious principles. As the numbers of these adventurers increase or diminish, so do the victims of this encouragement to disturb the minds of the community also vary in number. In this vicious plenitude of liberty, every body enjoys not only entire freedom of thinking and speaking, but also of acting. The rogue who is too lazy to work, is allowed, without inquiry into his knowledge, or belief, and without hindrance on account of character or of the mischievous nature of his doctrines, to harass the feelings, to excite the imagination, and to blight the happiness, of many of those who listen to him. It is not seen, or, if seen, in no way guarded against, that the more dangerous the doctrine, the greater the fanaticism, or the more vehement and impassioned the declamation with which it is promulgated, the more intensely are the uneducated affected, and the mind disordered by it. The more absurd and inflated the harangue, the more frantic the manner, and the greater the outrage on common sense and decency, the moral infection sinks the more deeply, and spreads the more widely, until mental disorder assumes a truly epidemic form. That this is not over-stated, is sufficiently proved by what has taken place recently in this metropolis, by the camp-meetings in America, and by the "revivals" in Scotland and in that country.

287. The frequency of mental disorder from this cause has been insisted upon by Darwin, Perfect, Falret, Jacobi, and others, but somewhat doubted by Dr. Prichard. According to my own observation, I believe this to be a frequent cause of insanity in this country, particularly amongst protestant dissenters, — but of very irregular frequency, owing to the circumstances just alluded to. The forms of disorder caused by it are chiefly theomanía, melancholia, suicidal insanity, mania, and mania complicated with hysteria. It must not, however, be supposed that religious feelings are generally the only and sole cause of mental disorder, amongst persons whose minds are much engaged with these sentiments; or that all the cases of insanity, in which the mind is occupied with religious ideas, have proceeded either solely or chiefly from this source. In the great majority, perhaps, of instances, other moral causes, or even bodily disorders, have either predisposed the mind to be influenced by these feelings, or have been associated with them in their operation on the mind. Dr. Jacobi observes, that the original cause of derangement is often some misfortune, or some physical influence, — religious ideas rather determining the morbid effect upon the mind, than actually originating it. There is much truth in this, and it is most important in respect of treatment. I have witnessed several cases illustrative of the justness of this view; and, by acting upon it, they have had a favourable issue.

288. The more civilised the human mind, the more desirous it becomes to form anticipations of the future, or to entertain hopes and fears of good and evil, which are not limited to the present state of existence. In forming these anticipations, the knowledge of our own imperfections, and of our numerous acts of demerit, naturally impart to them a certain degree of gloom or despondency; and accordingly we find, in all civilised ages and countries, that these feelings, when inordinately indulged, — especially during states of physical disorder, or when the mind is already depressed by grief, anxiety, and bereavements, — have caused mental disease. Dr. Heinroth has collected numerous instances from the early fables of Greece,

showing, that madness from this cause was not of rare occurrence in the ages of remote antiquity. The circumstances in the moral nature of mankind, on which religious insanity depends, cannot very materially change, and may therefore be expected always to produce their usual effects; still they may be more remarkably predominant, or very much less so, in certain periods and places, than in others; and that they have been, and still are, thus variable, is well known. Dr. PRICHARD observes, that, in France since the revolution, the influence of religion on the community has been less than it ever was in any civilised country; and French physicians have informed him, that cases of religious insanity have become proportionately rare. M. ESQUIROL states, that the changes during the last fifty years, "in the moral sentiments and habits of the people, have produced more instances of madness in France, than all their political calamities. The change in ancient customs and fixed habits, in old and established sentiments and opinions for speculative theories and dangerous innovations, has contributed to this. Religion now comes forward only as a formal usage on solemn occasions, and no longer affords her consolation to the afflicted, or hope to the desponding. Morality based on religion is no longer the guide of reason in the narrow and difficult path of life. A cold egotism has dried up all the sources of sentiment: there no longer exist domestic affections, respect, attachment, authority, or reciprocal dependences. Every one lives for himself; none is anxious to form those wise and salutary provisions which ought to connect the present age with those which are destined to follow it."

289. An enthusiastic, or a vehement and impassioned, mode of preaching, and declamations abounding with frightful pictures and condemnation, are not confined to any sect; and, in some countries, are as common amongst Romanists as among Protestants and protestant dissenters.—The itinerant missionaries of all sects—of Romanists as well as of Protestants—are remarkable for fanaticism; and for modes of preaching, more calculated to disorder the minds of persons, who are already suffering the ills of life, the depressing passions, bereavements of affection or of fortune, exhaustion of nervous power, and bodily disease, than to afford the consolations which religion is intended to administer in these and other circumstances of distress.

290. The question, which has been often agitated, as to the greater prevalence of insanity among Romanists and Protestants, may seem to bear upon this topic, but not so closely as it may at first appear; for, although mental disorders may be more frequent in the latter, than in the former, it by no means follows that religious feelings are the causes of this frequency, or that the numbers of the insane are greatly increased by cases of this kind. The number among Romanists may be as great as that in Protestants,—other circumstances compensating for the less influence of this cause in the former, than in the latter persuasion. That religious insanity, however, is much less common in Romanists than in Protestants, and especially protestant dissenters, cannot be doubted by any one whose sphere of observation has enabled him to form any opinion on the matter. Dr. HALLARAN (*Pract. Observ. on Insanity.* Cork, 1818, p. 32.) states, that in the Lunatic Asylum at Cork, in which the admissions of Romanists are about ten to one of Protestants, no instance has occurred, within his recollection, of mental derangement in the former from religious enthusiasm; but that several dissenters from the established church have been so affected. The reason of this difference is obvious. The ministers of the Romish church will not allow the minds of their flocks to distrust points of doctrine and discipline,—or to fall into these doubts, which distract the minds of those who are either wavering in their opinions or entertain entire liberty of conscience.

291. Whilst HALLARAN, GUISLAIN, LEUPOLDT, BURROWS, and others, contend for the greater prevalence of mental diseases in Protestants than in Romanists, JACOBI and CHIARUGGI believe that cases of religious insanity are also frequent in the latter. Dr. JACOBI remarks, that the character of religious madness in members of these two communities, and the manner of its accession, are for the most part different. In the lunatic asylums of Roman Catholic Germany, many of the inmates of the lower classes have become religiously mad, from the delusions of a wild and unregulated imagination, excited by superstitious phantasms, through neglect of the culture of the understanding, and the overpowering influence of sensual passions. Dr. PRICHARD has given a table from JACOBI, of the comparative prevalence of insanity in the Romanists and Protestants of the Prussian States on the Rhine; and it appears from it, that the proportion of lunatics in the former, compared with that in the latter, is as 11 to 10; and that the proportion is much higher among the Jews than in these persuasions. Still, this conveys no information as to the comparative prevalence of religious insanity among them.

292. Mr. TUKE's account of the Retreat, the asylum belonging to the Quakers or Friends, furnishes only 3 cases, out of 149, which could at all be ascribed to anxieties connected with religion; and in his list of causes of insanity amongst the inmates of this asylum, pride, ambition, jealousy, rage, debauchery, penury, or care produced by hardships, &c.—causes so productive of insanity in other institutions,—are not even mentioned. The exemption from these prevalent causes of mental disorder are attributable to the strictness of moral education and discipline, to the restraints imposed on the imagination and the indulgence of the passions, and to the absence of enthusiastic excitement on religious topics, in this sect. Still, insanity is as prevalent among Quakers, as among any other sect, relatively to their numbers,—owing, as above remarked (§ 253.), to the increased influence, in them, of hereditary predisposition.

293. From what has been now stated, it will appear that the frequency of religious insanity in different persuasions and sects will depend upon the excess of fervour characterising them. Exuberance of zeal on any subject soon passes on to madness in some constitutions; and on religion, unless tempered by a sound judgment, it is apt to degenerate into fanaticism, and thence into delirium which often becomes permanent. Excessive fervour, or enthusiasm, generally shows itself in religion, when any revolution of opinion or doctrine takes place; and when new lights and new sects arise amongst those who have

received a certain amount of education and religious instruction. Dr. Robertson (*Hist. of Charles V.* vol. ii.) has well remarked, that "when the human mind is roused by grand objects, and agitated by strong passions, its operations are apt to become irregular and extravagant. Upon any great revolution in religion, such irregularities abound most at that particular period, when men, having thrown off the authority of their ancient principles, do not yet fully comprehend the nature, or feel the obligation, of those new tenets which they have embraced. The mind in that situation, pushed forward with the boldness which prompted it to reject established opinions, and not guided by a clear knowledge of the system substituted in their place, disdains all restraint, and runs into wild notions, which often lead to scandalous and immoral conduct. Such was the effect in the first ages of Christianity, as well as at the era of the Reformation. The renunciation of the ancient faith, and ignorance of that which they had embraced in lieu of it, excited converts to acts more resembling insanity, than of that religion which inculcates the purest morality and government of our passions." — Dr. Burrows states, that he does not recollect an instance of insanity from religion, in any person steadfast to his ancient opinions. Wherever the disorder was suspected to proceed from this cause, it was clearly traced to the adoption of new tenets, which had not been comprehended, and found to originate during the conflict in deciding between opposite doctrines.

294. It must not be supposed, from what I have advanced, that the Christian religion is truly chargeable with causing insanity; it actually has an opposite tendency. Mistaken views, excessive fervour, unfounded fears, and various feelings arising from these sources, are the only causes of insanity in connection with religion. Amongst those who entertain just and sober opinions on religious topics, — who make Christian doctrines the basis of their morals, the governors of their passions, the soothers of their cares, and their hopes of futurity, — insanity rarely occurs. The moral causes of derangement, which would not fail of producing injurious effects on others, prove innocuous in them, for these causes would be met by controlling and calming considerations and sentiments, such as would deprive them of intensity or neutralise their effects. Truly religious sentiments and obligations soothe the more turbulent emotions, furnish consolations in afflictions, heal the wounded feelings, administer hopes to the desponding, and arrest the hands of violence and of despair.

295. In considering how far insanity may have arisen from mistaken views, or ill-regulated zeal, in religion, the influence of sounder Christian doctrines in preventing its occurrence from other moral causes ought not to be overlooked; but this beneficial influence is too often unheeded, from being seldom brought to the notice of the physician, or from being altogether concealed in the breasts of those who have experienced it, whilst the origin of mental disease in disordered religious feelings is obtruded upon his attention. If the data could be procured, I believe, that it would be certainly found that the very great majority of those who have committed suicide in states of mind which at least very nearly approach, if they do not altogether amount to, insanity, actually either have been of no religion at all, or have entertained a very imperfect and inadequate sense of it; and that religious obligations have often suppressed suggestions of suicide, which would certainly have been committed if these had not been entertained. And further, I believe, that a very large proportion of those who become insane, especially amongst the lowest and most ignorant classes, have fallen into this state from the scope given to their temper and passions, and from other mental causes, deprived of that salutary control, and of those consolations, furnished by the beneficent doctrines of Christianity. The tendency of Cowper to mental derangement was long opposed by the influence of true religious principles; and, in later life, a sense of his duties and obligations arrested his hand in the act of suicide.

296. *B.* Physical Causes of Insanity. — The *physical causes* of insanity may be divided into — 1st, Those which affect the encephalon chiefly and immediately; 2dly, Those which exhaust organic nervous power, and disorder the general organic sensibility; 3dly, Those which act upon remote organs or parts, with which the brain is disposed to sympathise. — Under the head of physical causes, M. Esquirol has arranged *hereditary predisposition.* In treating of the causes of insanity, this should be viewed apart from the exciting physical causes; for, although it often appears to occasion insanity, without any other circumstance being recognised to develop the predisposition, and although it is strictly physical, it still requires, from its nature and influence, an early and separate consideration (§ 251.).

297. *a.* Of *the causes which more directly affect the encephalon,* — *α. Insolation*, *sun-stroke*, and exposure of the head to great heat, as to the fires of forges, &c., deserve a passing notice. M. Esquirol has observed considerable influence from the last of these; and I have known several instances of exposure to the heat of the sun in warm climates, and in hot days in temperate countries, having developed an attack of mania. Cases of this kind partake much of the character of phrenitis, and are actually such in most cases, especially at their commencement; whilst, in others, more or less of congestion takes place, or follows a state of inflammatory action. It is chiefly where a marked predisposition has existed, or moral causes have cooperated with this, that mental disorder is developed, or persists for a considerable period. In some instances, exposure to the sun's rays first produces an epileptic seizure; the derangement of mind either immediately following it, or appearing after several recurrences. These cases more obviously proceed, at first, from the congestion, or vascular turgescence, of the brain or of its membranes, caused by the solar rays. Exposure to the heat of *charcoal fires* has also been observed to cause insanity; the fumes of these fires probably contributing to these injurious effects. The liability of cooks to mental disorder, which has been remarked on the Continent especially, is probably attributable to this cause.

298. *β. Frequent or habitual determinations of blood to the head,* and *congestions of the brain and its membranes,* are amongst the most common physical causes of insanity, especially when an hereditary disposition to it exists; but, frequently, some fully developed or specific organic malady

of the brain appears before the effect upon the mind is manifested, — especially *apoplexy* and *paralysis*. In these latter cases, softening of a portion of the brain, or hæmorrhage in some part of it, or both lesions, with various attendant changes, are the more immediate effects, and upon these the mental disorder is only contingent in some instances. When mental disease follows apoplexy, some form or other of paralysis is often associated with it. The varieties of mental disorder consequent upon *apoplexy*, or upon *paralysis*, or upon both, are chiefly the several grades of dementia, and forms of partial insanity; but any other variety may also proceed from them. (See art. Apoplexy, § 52. *et passim.*)

299. *γ. Epileptic* and *convulsive affections* are, perhaps, more frequently productive of insanity, and especially of the several grades of dementia (§ 155, 156.), than any other disease, unless, perhaps, *apoplexy* and *paralysis*. M. Esquirol states, that of 300 epileptics in the Salpêtrière more than one half are insane. It may be supposed that the influence of epilepsy in causing insanity depends chiefly upon congestion of blood on the brain, or vascular determination to it; but this inference may be only partially correct; for, even admitting that these lesions of the cerebral circulation are present in many epileptic cases, it does not follow that they exist in all of them. I believe that it will be found, that when epilepsy is connected with, or depends upon, a deficiency of blood, and great impairment of nervous power (see art. Epilepsy, § 27.), that it is more apt to be followed by insanity than when attended by either congestion, or determination of blood to the brain. M. Esquirol remarks that, although epilepsy and convulsions are often causes of insanity, especially of furious mania and dementia, that *vertigo* still more frequently precedes, and is more destructive to the mental powers than they. I believe that vertigo more frequently proceeds from an impaired circulation in the brain, conjoined probably with weakened organic nervous energy of this organ, than from opposite states of the circulating and nervous system. — *Cataleptic* and *ecstatic* affections, and *somnambulism*, may also lapse into mental derangement; or, in other terms, the states of nervous influence and of cerebral circulation, causing these affections, may be only early stages or grades of the same physical disorder of which insanity is the consequence.

300. *δ. The transference or metastasis of disease to the encephalon*, is a not infrequent cause of insanity, especially where a predisposition to it exists. The sudden disappearance, or the suppression, of cutaneous eruptions, of accustomed discharges and evacuations, and of certain painful or constitutional maladies, has often been followed by mental disease. Cases illustrative of the production of inflammatory and other diseases of the brain, and of the various forms of insanity, from these causes, abound in all practical medical works. The suppression of herpes, of scabies, and of other chronic cutaneous eruptions, — of various discharges, as leucorrhœa, chronic diarrhœa, &c.,— of hæmorrhagic evacuations, as epistaxis, hæmorrhoids, menorrhagia, — and of gout and rheumatism, — has frequently been followed by insanity, and especially by mania, and melancholia, either in their simple forms, or complicated with paralysis or epilepsy. Where the mental disorder thus supervenes, distinct evidence of acute or subacute inflammation of the brain or of its membranes, or of both, is often evinced for some time before the mind becomes disordered.

301. *ε. Inflammatory and other diseases of the brain* are frequently followed by mental derangement. The delirium symptomatic of these maladies, and of fever with predominant affection of the brain, may subside into one or other of the forms of partial or general insanity; and the various organic lesions occurring in the encephalon and its membranes may be attended, at an early stage, with more or less mental disorder; or, after having given rise to epilepsy, paralysis, or apoplexy, may be followed by such disorder. In such cases, however, the mental affection is to be viewed rather as a contingency, than as a necessary consequence of the organic disease.

302. *ζ. Injuries of the head* are sometimes productive of insanity; owing chiefly to chronic or slow inflammatory action, and its consequences in the brain or membranes. In some cases, acute disease, attended by delirium, is the first effect; but, consequent upon this, any grade of chronic insanity may appear. Occasionally, even, the mental affection does not occur until years have elapsed from the receipt of the injury; and it then may present every grade of severity, and may even be associated with epilepsy or paralysis. During the long interval that may thus elapse, various symptoms, referrible to the encephalon, are generally complained of, and are sometimes so manifest to the physician, as to lead him to dread the impending calamity, and to employ means, which as often fail as succeed in averting it. Dr. Prichard remarks, that there are instances in which a slight peculiarity of character, not amounting to insanity, has remained long, and perhaps through the life of the individual, who has sustained a severe injury of the head. Sometimes this amounts to a kind of moral insanity; the temper being more irritable, and the feelings less under restraint, than formerly. In other instances, there have been greater energy and activity, more of excitement in the general character, which have been thought a change for the better, rather than a morbid alteration. Of this, two remarkable cases have come under my own observation. Van Swieten, Haller, and others have adduced instances of congenital and puerile imbecility having been removed by injuries on the head; and Dr. Prichard mentions a family, consisting of three boys, all idiots, one of whom, having received a severe injury on the head, had his faculties restored, and became a professional man of good talents.

303. *b. Whatever greatly exhausts organic nervous power*, both predisposes to, and directly occasions, insanity. — *α*. Many, however, of those causes, which thus affect nervous energy, favour congestion on the brain, and occasion disease of other vital organs, tending to disorder the functions of the brain sympathetically. Of these, the most influential are masturbation and libertinism, or sexual excesses, sensuality in all its forms, and inordinate indulgence in the use of intoxicating substances and stimulants. The baneful influence of the *first* of these causes is very much greater, in both sexes, than is usually supposed; and is, I believe, a growing evil, with the diffusion of luxury, of precocious knowledge, and of the vices

of civilisation. It is even more prevalent in the female, than in the male sex; and in the former it usually occasions various disorders connected with the sexual organs,—as leucorrhœa, displacement of the uterus; difficult, or disordered, or suppressed, or profuse menstruation; both regular and irregular hysteria, catalepsy, extasis, vertigo, various states of disordered sensibility, &c., — before it gives rise to mental disorder. In both sexes, epilepsy often precedes insanity from this cause; and either it or general paralysis often complicates the advanced progress of the mental disorder, when thus occasioned. Melancholia, the several grades of dementia, especially imbecility and monomania, are the more frequent forms of derangement proceeding from a vice, which not only prostrates the physical powers, but also impairs the intellects, debases the moral affections, and altogether degrades the individual in the scale of social existence, even when manifest insanity does not arise from it. Sexual excesses, and libertinism in persons predisposed, hereditarily or otherwise, have a similar effect to the former cause, although neither so frequently nor so certainly; the mental disorder generally assuming the same forms and morbid associations as have just been mentioned.

304. *β. Intoxicating substances and stimulants* are causes of mental disorders in most countries; but they are among the most influential of all the exciting causes in the lower classes, particularly in the United States of America, in Great Britain and Ireland, and in Germany. In France, Italy, and Spain, this vice is much less frequent. Spirituous liquors are the most generally indulged in; and are the most injurious in their effects, not only on the nervous system, but also upon the digestive and excreting organs. A large proportion of the admissions into pauper lunatic asylums arise from this cause, especially in large cities and manufacturing towns and districts. Mania, monomania, and melancholia most frequently proceed from the abuse of intoxicating liquors; and the cases which are thus caused, are amongst those which are oftenest cured — at least, for a time. The removal of the cause, and the use of sedative means, generally cure the attack: but relapses or recurrences are more frequent in these, than in any other class of cases.

305. The excessive use of opium is as injurious to the nervous energies, and to the mental powers, as addiction to spirituous liquors; but the ill effects resulting from it on the mind, are not often observed in this country. — I have known several instances, all of them females, of the acetate of morphia having been used, instead of opium, as a restorative and intoxicating agent. It was ultimately more or less injurious in all; and in one, partial insanity, with suggestions of suicide, appeared, — but probably other causes contributed to the morbid effect.

306. *γ.* The abuses of *mercurials*, and particularly of *calomel* as a common or frequent purgative, has, in several instances in which I have been consulted, been productive, first of depression of the nervous power, and of a morbidly increased state of the general sensibility, and subsequently of melancholia and other forms of monomania. A surgeon, a pupil of the late Dr. Currie, was in the habit of taking large doses of calomel, at least twice, but more frequently oftener, in the week. He believed himself subject to disease of the liver, resorted to this medicine when he found his spirits greatly depressed, and considered that he was better the day after taking it. He persisted in the frequent use of calomel, and became more and more nervous and hypochondriacal. He was afterwards melancholic, entertained mistaken views of religion, and attempted suicide, which he accomplished in a subsequent attempt. — The daughter of a clergyman in this city was attended by this surgeon, and had very frequently taken large doses of calomel. Her health and spirits had become remarkably impaired, and her intellects disordered. There was no hereditary predisposition to insanity in either side of the family. She had been fond of company and amusements; but was melancholic, physically out of health, tormented by the most distressing religious fears, and refused being seen by her relatives and former friends, when I was directed to visit her. Her despondency, mental misery, and religious delusions were remarkable; and she had frequently contemplated suicide, in order to terminate her suffering. She completely recovered under a restorative treatment, aided by change of scene and of air, and by suitable moral management.

307. *δ. The too frequent or excessive use of colchicum*, for the removal, suppression, or prevention of gout, has given rise to insanity in three instances in which I was consulted. In one of these, melancholia was the more immediate disorder of the mind; in the others, incoherence and imbecility, with illusions, were the consequences. — All powerful *depressants*, and even *cold*, either excessive in grade, or prolonged in its operation, may occasion insanity, by their operation on the nervous power.

308. *ε. Excessive or prolonged lactation*, relatively to the patient's strength, profuse evacuations, particularly leucorrhœa, frequent menorrhagia, profuse hæmorrhoidal discharges, &c., have also induced melancholia, and other partial forms of insanity, and even imbecility, or more complete dementia, chiefly by exhausting the vital powers, especially of the nervous system. It will afterwards be shown, that *puerperal insanity* is occasioned partly by this cause, or rather by the evacuations consequent upon parturition, in connection with previous suffering, and increased susceptibility of the nervous system. Something also may be imputed to the altered state of the general circulation, and of the condition of the uterine organs.

309. *c. Diseases of Organs with which the Brain more or less sympathises*, not infrequently cause insanity, when a predisposition to it already exists. So intimately associated in function are all the organs of the body, through the numerous bonds of union furnished by the organic nervous and vascular systems, that serious disease seldom exists in either, without the functions of one or more of the others being remarkably disturbed: and when visceral disease occurs in a person who has an hereditary or an acquired predisposition to mental disorder, the former is often the cause of the development of the latter; various other circumstances, however, moral and physical, often co-operating with this cause, in the production of the morbid effect upon the mind. — Of this class of physical causes, habitual constipation, inflammatory irritation of the gastro-intestinal mucous surface, diseases of the heart and lungs, functional

disorders and organic lesions of the uterus, and diseases of the biliary and urinary organs, are the most important. It is chiefly when these visceral maladies appear in an obscure and insidious manner, and proceed slowly, that the functions of the brain become disordered in a chronic form.

310. *α*. Without attributing nearly so much influence, as M. Broussais has done, to inflammatory irritation of the *gastro-intestinal mucous surface*, it cannot be denied that its pre-existence is of considerable importance in the production of the mental disorder. But it is very seldom the sole physical cause in these cases; most commonly, exhaustion or depression of the organic nervous influence co-operating with it in producing the effect upon the mind. The disorder of the digestive organs is generally caused, by the excessive use of stimulating and indigestible food, among the opulent; and by constipation, intemperance, unwholesome food, and by cold and want, among the lower classes. In these cases, hypochondriasis, or hypochondriacal melancholia, first appear; and various forms of general insanity supervene.

311. *β*. Severe functional and organic disease of the *heart* or *lungs* may excite insanity in the predisposed, owing to disorder of the circulation in the brain, consequent upon interruptions of it in these organs. — When mental derangement follows diseases of the *biliary* or of the *urinary organs*, it may proceed more immediately from the influence on the brain of the excrementitial matters accumulated in the blood, in consequence of the impaired or disordered function of these organs.

312. *γ*. Of the operation of the functional and organic affections of the *uterine organs*, but little need be here added to what has already been observed. In these cases, the sympathetic effect takes place, most probably, by the propagation, to the spinal cord and brain, of irritation originating in the sexual apparatus; and the mental disorder is generally preceded and attended by one or more of the numerous forms of hysteria, or by epilepsy, and sometimes also by hypochondriasis, or great lowness of spirits. This is especially the case when the catamenia are difficult or suppressed. In many cases, not only uterine disorder, but also gastro-intestinal irritation, is accessory to the causation of the mental disease.

313. In considering the operation of all these physical causes, it should not be overlooked, that it is often extremely difficult to determine, whether the disorder originates in the brain — the other organs sympathising with it, — or whether the disturbance of the mental powers is altogether owing to disease of viscera remote from the encephalon. But, however difficult it may be, an attentive examination of the history and existing symptoms of the case should be instituted, to the determining of this point; as much of the success of treatment will depend upon correct views regarding it.

314. *δ*. When organic nervous or vital power is much depressed, especially in respect of the digestive and excretive functions, *accumulations of morbid secretions, and collections of fæcal matters*, are liable to form in the intestinal canal, and particularly in the *cæcum* and *colon*. These dilate, displace, irritate, and obstruct the bowels; occasioning flatulent distension, spasm of the muscular coats, and various disorders of the whole tube, as well as of the collatitious viscera. These morbid accumulations are apt to occur even in persons who suppose their bowels perfectly open and regular; and they more certainly take place in those who are habitually costive or constipated. The effects, however, of collections of morbid secretions in the bowels, — particularly in the large bowels, — are not limited to these, or even to the adjoining viscera; although, if even thus limited, they would often be sufficient to excite, by the intimate sympathy existing between the digestive organs and the brain, functional disorder of the latter, especially in persons already disposed to such disorder. But there is every reason to believe, that when morbid or fæcal matters accumulate in the intestines, either with or without constipation, the chyle thereby becomes more or less impure or contaminated, and that a portion of these matters is absorbed into the circulation, the blood being consequently altered, and a state of general cachexia being thus produced. Where the predisposition to insanity already exists, the morbid materials conveyed into the blood will be often sufficient to derange the functions of the brain; and, not infrequently, this consecutive derangement will not be limited to these functions, but will extend to several others.

315. The sympathetic influence of the digestive organs on the brain, in connection with the deterioration of the chyle, and the absorption of excrementitious matters from the bowels into the blood, will in this manner occasion hypochondriasis, melancholia, partial and general insanity, and, ultimately, even some of the complications which these occasionally present. The displacements and dilatations of the colon so often observed in melancholia, and sometimes also in other disorders of mind, most probably result from frequent or habitual constipation, even previously to the appearance of mental derangement. And the inflammatory irritation of the gastro-intestinal surface, already noticed (§ 310.) as causing and attending many cases of insanity, is probably the more immediate effect of the impaired energy of the digestive canal, and of the accumulation in it of morbid matters; the consequences as respects the chyle and the blood, just contended for, increasing the effects upon the functions of the brain. The influence of constipation, or even of habitual costiveness, in causing insanity, and the good effects of powerful purgatives in the treatment of it, were well known to the ancients, and to most of the older writers; and, though fully recognised in this country, have been imperfectly estimated on the Continent in recent times, and even erroneously viewed by many, and particularly by Broussais and his disciples.

316. *ε*. Besides the above physical causes, *pregnancy*, the *accumulation* of morbid matters in the intestinal canal, and *of bile* in the biliary apparatus, the presence of *worms in the bowels*, *hypochondriasis*, and *hysteria*, frequently give rise to insanity. The abuse of medicines, and of all substances which act powerfully on the nervous system, and especially of green tea or of coffee, is occasionally, also, a cause of mental disorder.

317. *ζ*. M. Esquirol (*Mal. Ment.* t. i. p. 64., et t. ii. p. 682.) has given the following *tables of the causes of insanity*; — the *first* comprising only the physical causes among female cases; the *second* embracing both physical and moral causes in cases of both sexes at Charenton.

Physical Causes.	Salpêtrière.	M. Esquirol's Establishment.
Hereditary predisposition - -	105	150
Convulsions of the mother during gestation - -	11	4
Epilepsy - -	11	2
Disorders of the catamenia - -	55	19
Consequent on lying-in - -	52	21
Critical age - -	27	11
Progress of age -	60	4
Insolation - -	12	4
Injuries of the head	14	4
Fevers - - -	13	12
Syphilis - -	8	1
Mercury - -	14	18
Intestinal worms -	24	4
Apoplexy - -	60	10
	466	264

Causes, Physical & Moral.	1826.	1827.	1828.	1829.	1830.	1831.	1832.	1833.	Total.
Hereditary predisposition -	19	19	58	65	70	36	38	34	337
Masturbation - - -	7	9	7	7	10	3	3	6	52
Libertinism and excesses of all kinds - - -	8	8	8	12	25	15	33	37	146
Abuse of mercury - -	3	3	10	13	6	5	1	3	44
The abuse of spirituous liquors - - - - -	22	17	25	11	16	10	18	15	136
Insolation, &c. - -	0	5	2	1	2	0	2	0	12
Injuries on the head -	1	1	2	9	3	2	1	1	20
Suppression of accustomed evacuations - - -	5	4	4	13	3	12	7	6	54
Suppression of habitual suppuration - -	0	0	0	0	1	0	2	0	3
Consequent upon parturition - - - -	2	3	5	8	1	2	3	4	28
Cerebral affections - -	0	0	0	0	0	6	6	5	17
Epidemic cholera - -	0	0	0	0	0	0	3	0	3
Domestic distresses, &c. -	38	22	29	26	47	38	40	38	278
Excessive study and watchings - - - -	2	3	3	2	2	1	2	1	16
Reverses of fortune - -	7	7	6	5	3	15	2	4	49
Gambling - - -	0	0	2	0	1	2	0	0	5
Jealousy - - - -	3	2	8	3	0	1	1	0	18
Disappointed affection -	12	9	8	2	3	1	2	0	37
Wounded self-love - -	4	1	1	2	3	2	2	1	16
Fright - - - -	1	0	4	8	14	5	2	1	35
Exalted devotion - -	7	9	2	1	3	1	1	0	24
Excessive joy - - -	0	0	1	0	1	0	0	0	2
Reading romances, &c. -	3	3	7	0	0	0	0	0	13
Political events - -	0	0	0	0	13	15	3	1	32
									1375

318. M. Esquirol remarks, that the causes were often ascertained with much difficulty; as the patients themselves were generally incapable of assigning them, and the friends could not always do so — at least, with any degree of precision. It is probable, however, that two or more causes were concerned in producing the effect, and that various circumstances were omitted; he considers that hereditary predisposition is much more frequent than stated in the above table. Under the head of domestic distresses, are included all the moral affections which are called into action in the interior of a family. The political changes in Paris, in 1830, gave rise to the cases from this cause, and to those produced by frights.

319. n. *Sol-lunar influence* was very generally supposed to excite or to favour the appearance of insanity, as well as to cause exacerbations of the malady. M. Esquirol could not verify this opinion by the results of his experience. It is probable, however, that electrical states of the air, or sudden vicissitudes of the atmospheric electricity, in connection with similar changes in the electrical currents through the body, have some influence on this malady. The effects of excessive cold and of great heat in causing madness, and the excitement produced in lunatics by atmospheric commotions, are indications of this influence. However this may be, there can be no doubt of marsh miasmata being a not uncommon cause of insanity, and especially of melancholia and dementia.

320. *C.* Various circumstances arising out of the manners and social and political states of a community may increase the frequency, or contribute to the production, of insanity. Still, these states are more or less connected with the affections of the mind and the other moral causes, or are resolvable into them. — *a.* The social conditions resulting from prevailing modes of education have been considered by M. Esquirol as most influential in increasing the numbers of the insane. Too much care is taken to cultivate the mind, not considering that the affections of the heart require equal care. In all classes, an education is bestowed upon the young, above what is suitable and proper to their station in society; and hence sentiments of ambition, and of discontent with their condition, are instilled into their minds from childhood. This early and ambitious education raises the mind of the young above, and too often in opposition to, the experience of their parents; and hence the opinions of the latter are despised or neglected. A person who has not been duly controlled in childhood is ill able to endure the vicissitudes and reverses to which an active life exposes him in the present state of society, — his passions being thereby deprived of a salutary curb, and his reason of its surest props, insanity often follows upon the least adversity. The manner of living in the easier classes of society, — the passion for dress, for exciting romances, for intrigue, for frivolities and amusements, — engender a constant thirst for excitement, and increase the frequency of nervous complaints and mental disorders. The vices, and the miseries and privations consequent on these vices, in the lower grades of society, have a no less marked influence in causing the latter of these effects more especially.

321. *b.* In country districts, the prevailing passions are less turbulent and exciting than in cities and large towns. Love, anger, and domestic contrarieties are the most frequent moral causes of mental disorder in the former; whilst, in the latter, ambitious views, speculations, disappointed hopes, reverses of fortune, excessive mental labour, watchings and late hours, greater depravation of manners, and more vicious indulgences, are added to these; and, consequently, insanity is more prevalent in populous, commercial, and manufacturing towns, than in rural places. In proportion as the latter causes are prevalent in any community, and are aided by a more or less general propensity to drunkenness, or to libertinism, or by the vices of education, and of conduct in the richer classes, and by the want of both in the lower orders, so do the disorders of the mind become more frequent.

322. *c.* Even *forms of government* have considerable influence in contributing to this result. There is not the least doubt of the ill effects of a too great freedom of public opinion and acts, and of public writing and speaking, upon mental sanity. With the freedom of opinion, and the latitude allowed to the expression of it, without re-

gard to the feelings and the interests of individuals, or to the morals and sympathies of the community, those emotions which most seriously disturb the mind, are brought into the most violent and distressing action, and the calm dictates of reason thereby overthrown. The political strifes, the popular elections, the borough and parish contentions, in this country, and in the United States of North America, furnish sufficient proofs, to the candid mind, of the truth of this position. The exciting, the contaminating, and the disgusting occurrences and circumstances, which daily, and even hourly, are placed before all classes in society, in most exuberant variety and particularity of detail, — the moral poison with which the whole is garnished, in the lowest, the cheapest, and the most diffusible of these vehicles of abominations, and of mental infection, — the liberty which contaminates the innocent, demoralises the public, injures the feelings, and benefits only the worthless and the base, — all tend to the consummation of the injurious effect upon the mental health of the community — to the increase of crime, of madness, and of suicide.

> " Here, by the bonds of nature feebly held,
> Minds combat minds, repelling and repell'd:
> Ferments arise, imprison'd factions roar,
> Repress'd Ambition struggles round her shore:
> Till, overwrought, the general system feels
> Its motion stop, or frenzy fire the wheels."

323. *d. Political commotions*, by exciting revenge, and the more violent passions of the public, by fomenting ambition, by rousing to intellectual exertions, and by overturning fortunes and the established order of things, have a marked influence in augmenting the frequency of insanity. The frights, terrors, outrages, distresses, and losses of fortunes, of friends, of honour, &c., consequent upon foreign invasions, sieges, and civil and domestic wars, are most fruitful causes of derangement on these occasions. Numerous proofs of this have been adduced by the French and German writers since the last war. Revolutions moreover do not only greatly increase the numbers of the insane, but also impart certain characters to the prevailing mental disorders. M. Esquirol observes, that, when the ancient monarchy was destroyed, many became mad from the loss of fortune and friends, and from the frights and terror caused by the consequent anarchy. When the Pope came to France, religious insanity was most frequent; and when Napoleon made princes and kings, insanity from ambition and pride was frequent, and kings and queens were numerous amongst lunatics. Religious revolutions have a similar influence; and even the prevailing ideas called into existence or activity by these revolutions, by great political events, and by popular commotions, contribute both to the frequency, and to the character, of this disorder. The prevalence and features of madness, during the Crusades, and for long afterwards; during the Reformation, in Germany, the Low Countries, and Great Britain; and during the civil wars, and the temporary domination of puritanism, under the long parliament and Cromwell; are illustrations of what I have just advanced.

324. *e.* M. Esquirol states, that a sedentary, indolent, or inactive mode of life favours the occurrence of insanity; and that persons who have been accustomed to a very active life, as merchants, traders, professional men, and soldiers who have led an irregular and an eventful life, are liable to this malady when they settle to the enjoyment of wealth and splendour.

325. *f.* Another circumstance of great importance presents itself in the relative frequency of insanity in the *married* and *single*. The following *Table* contains the results furnished on this subject by Esquirol, Desportes, Jacobi, and Prichard: —

	Desportes.		Jacobi.		Esquirol.	
					Charenton.	
	Salpêtrière. Females.	*Bicêtre.* Males.	Females.	Males.	Females	Males.
Unmarried - -	980	492	599	974	193	505
Married - - -	397	201	156	176	363	387
Widowers and Widows	291	59	80	30	69	40

The differences in these results depend much upon the classes of persons admitted into the institutions from which these results are obtained, and upon the limitations observed as to admission. Still, enough is proved by them to suggest important considerations connected with the hygiene and prophylaxis of insanity. With respect to the results which are here adduced, Dr. Prichard observes, that, as it appears probable that celibacy tends to augment the numbers of lunatics, an inquiry is suggested as to the manner in which this result ensues. Is it through the restraints which the condition of celibacy imposes, or through the vices to which unmarried persons are more frequently abandoned? M. Esquirol is of opinion, that, where one case of insanity arises from the former cause, a hundred result from the latter. A case occurred to me some years ago, of a well-educated man, hereditarily disposed to insanity, who, after long periods of continence, experienced symptoms premonitory of mania. He married soon after, having been under my care. Several years have since elapsed, without any indication of mental disorder having appeared. Persons happily married, generally lead more regular lives, in all respects, than the unmarried, and are more fixed in their pursuits and employments. In many other respects, also, the condition of married persons is much less favourable to the excitement of madness than that of celibacy.

326. In taking a survey of the feelings, the emotions, and the passions, as well as of the numerous circumstances connected with the social states, productive of insanity, the conclusion is irresistible, that the diminution of its frequency depends more upon the constitution of individual minds, proceeding from habitual control, and from a due exercise of moral and religious principles and obligations, than upon all other circumstances combined.

> " Vain, very vain, the weary search to find
> That bliss which only centres in the mind.
> In every government, though terrors reign,
> Though tyrant kings and tyrant laws restrain,
> How small, of all that human hearts endure,
> That part which laws or kings can cause or cure!
> Still to ourselves in every place consign'd,
> Our own felicity we make or find:
> With secret course, which no loud storms annoy,
> Glides the smooth current of domestic joy.
> The lifted axe, the agonising wheel,
> Luke's iron crown, and Damien's bed of steel,
> To men remote from power, but rarely known,
> Leave reason, faith, and conscience, all our own."

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